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A ROLE OF NERVOUS FACTORS IN SOMATIC PAIN.

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In recent years certain chronic pains have been considered to be due to sustained hypertonus of skeletal muscles, and this has been related to emotional states. Those usually described are backache and headache, but the syndrome is much more extensive. The full implications are important, as this is a common condition which is frequently overlooked.

This study was begun when several patients who complained of chronic abdominal pain were examined. In each, several surgical operations had been performed without relief, and the patients were eventually regarded as being "chronic hypochondriacs". All were then found to have paravertebral areas of tenderness, and when these were infiltrated with procaine solution their abdominal symptoms were temporarily relieved. A search was then made for similar cases, and as a result it was realized that these abdominal symptoms were but one manifestation of a syndrome that might present as diversely as chronic backache, headache, anterior thoracic or abdominal pain or coccyodynia. These symptoms usually had been regarded as being due to such organic conditions as fibrositis or spondylitis, or to the effects of trauma. In some cases, however, the pains had been obviously functional and it was then seen that in all cases concomitant nervous symptoms had been incidentally recorded.

The purpose of the investigation was to ascertain how far all these pains could be regarded as being of functional origin.

THE DATA.

The 140 patients to be described were examined in a medical practice. All were adults, 25 being males and 115 females. None was a "compensation case", nor was there one in whom physical disorder was eventually considered to be the cause of the symptoms. In all, associated nervous symptoms had been recorded, but in no case were these considered to be due to the pain, and in most cases they had preceded it by months or years.

The Physical Features of the Syndrome.

In all patients tender areas were found at one or more points. These were of the type commonly called fibrositic, but nodules were not present. The tenderness was over the attachments of antigravity muscles—usually in the paravertebral tissues. In some cases these gave rise to backache; in others pain was referred either diffusely or segmentally to remote parts.

The Backache.

Backache occurred anywhere along the back from the occiput to the coccyx. The onset was usually insidious, but

if it was acute as from trauma it persisted for longer than would have been expected. Although there might be periods of relief, it was chronic in duration It was aching, burning or of a type difficult to describe, and was relieved by relaxation and usually by rest and, conversely, was worsened by exercise of the part, fatigue or nervous tension.

On examination of the patient, the muscles of the region were often rigid and pain was felt on their movement. There was localized or diffuse tenderness on pressure, the former being more common about the spinous processes of the vertebræ, the scapulæ and the sacro-spinales, and the latter more common across the back of the neck, the sacrum and the coccyx. These areas became smaller or disappeared if the patient relaxed during examination.

The Referred Pain.

In some cases the pain was referred diffusely, as in lumbago, and could be relieved by one injection of procaine solution; in others it was referred to isolated parts which might then be thought to be primary lesions. Thus, localized tender areas away from the mid-line, for example along the lateral border of a sacro-spinalis or about a scapula, were frequently found to be associated with similar areas about the vertebra of the same segment, and they would often disappear if the perivertebral foci were infiltrated with procaine solution.

The vertebral areas of tenderness were at times difficult to find in the lumbar regions unless the patient lay prone with his head on one side and his arms along his sides. This manœuvre relaxes much of the general rigidity and allows the focal areas to be palpated. It is particularly useful when an origin is being sought for referred pain or tenderness.

On the other hand, tender points were sometimes found when axial tenderness was absent. These were rare in the dorsal muscles themselves, but common over their attachments. This suggests that, although on examination it was also in the interspinous ligaments, the axial tenderness was related to the attachments of the *erectores spinales*.

Of greater clinical interest was pain, with associated tenderness, that was referred from the back to other parts of the body. In the limbs this is well known, but there may also be vertical headache with tenderness of the scalp, and anterior thoracic or abdominal pain and tenderness on one or both sides of the body. The anterior thoracic pain is familiar, and the presence of tenderness in the intercostal or pectoral muscles is used in differential diagnosis. Pain and tenderness in the left submammary region, if not referred, were often associated with tachycardia of emotional origin. The implications of the abdominal pain seem to be less appreciated, as was evidenced by the number of laparotomy scars that were seen in these patients; the pain had been considered to be due to chronic disease of the gall-bladder, appendix or pelvic organs, and when these were removed, to adhesions, a spastic colon, diverticulitis or pancreatitis. This abdominal pain was perplexing, as it was felt by the patient to be deep in the abdomen, and as localized abdominal tenderness—often accompanied by tenderness in the adjacent vaginal fornix—was frequently present. Furthermore, in this group backache was often minimal or absent. Aids to diagnosis here are the axial tenderness, the absence of other signs and symptoms of a suspected condition, the relief of the pain by treatment of the back, and the consideration of the patient as a whole.

During a study of radiculitis due to spinal deformity it was observed that such abdominal pain and tenderness were frequent, and two further signs of value were often found. The first was that of areas of hyperæsthesia between the back and the site of the abdominal tenderness, and the second was the occasional altered texture of the subcutaneous tissues in the hyperæsthetic areas, so that one could predict tenderness by palpation. These tissues felt thicker and more resistant—as if œdematous—when picked up between the finger and the thumb. This observation makes one likely to accept some patient's statements regarding transitory swellings over painful areas.

Radiological evidence of vertebral change was absent in most cases, but spondylitis was not regarded as being the sole cause of the pain unless it was of gross degree. There were no neurological signs other than those of the radiculitis.

The Nervous Features of the Syndrome.

As nervous symptoms were recorded in every case, it was soon realized that pain and tenderness were only part of the syndrome.

The commonest nervous symptoms were tension, tiredness, irritability and depression. These were regarded as part of the pattern of a chronic anxiety state. Hysterical features were less common, and additional symptoms were usually others of anxiety as insomnia, palpitations or dyspnœa.

When these symptoms of anxiety were found, further examination of the histories showed evidence of emotional deprivation in childhood. This was present in no less than 70 cases. This is almost certainly too low a figure, because many of the patients were examined before the possible relationship between nervous factors and this syndrome was appreciated, and an adequate interrogation from this point of view had not always been made. Nevertheless, 31 patients had lost one or both parents during childhood, and with 39 other patients one or both of the parents were unsatisfactory, being alcoholic, cruel, psychotic, neurotic, inadequate, physically ill or the like.

It was now seen that while the soil for this chronic disorder was so often prepared in childhood, prolonged emotional stresses were present as immediate precipitating causes in at least 73 cases. Common examples of these were domestic difficulties or the ill health or death of a relative, especially if this entailed loss of support; the birth of a child or another undesired or resented responsibility; and the menopause, a hysterectomy or an extramarital *affaire* with the problems these bring. These conflicts were often rationalized and the symptoms innocently attributed to overwork or to post-traumatic disability.

Mechanisms.

The questions to be asked at this juncture are whether muscular tension can cause these chronic pains, and by what means an emotional state can cause this.

By using continuous electromyographic and electrocardiographic recordings, Malmo (1954) showed that patients reacted with individual specificity to non-specific stresses such as pain or noise. Thus those complaining of headache reacted with a generalized muscular hypertonicity, and those who had functional cardiac disorders with tachycardia. With Shagass (1954) he also demonstrated a relationship between muscle tension and interview content, high tension being associated with depressed mood and low tension with cheerfulness. Furthermore, in a given individual, particular themes were consistently asociated with increased tension in specific muscle groups. Holmes and Wolff (1952) showed that pain in the type of backache described above was associated with sustained skeletal muscle activity, and they suggested that the relative ischæmia of the hypertonic muscles allowed the collection of the "P factor" of Lewis. Wolff (1952) also demonstrated that painful stimulation in any part of the head, or emotional tension, led to sustained contraction of the head and neck muscles, which gave rise to pain in the shoulders, neck and head.

If hypertonic saline is injected into an interspinous ligament or into the *erectores spinæ*, pain, which is felt deeply, is referred to the peripheral distribution of the corresponding segmental nerve. It is accompanied by tenderness, cutaneous hyperæsthesia and muscular rigidity (Kellgren, 1938, 1939; Lewis and Kellgren, 1939). These results would explain the observation made earlier, in which tenderness in the perivertebral tissues appeared in many cases to be in the site of the pain, for if this and the local rigidity were abolished, the referred pain and

tenderness disappeared. The muscle spasm may be envisaged as inducing a local perivertebral disturbance, and this, in its turn, the radiculitis. The resulting pain would then cause further muscular spasm with the formation of a vicious circle, which could be broken by the procaine injection. If this is so, it would explain those cases in which permanent relief is obtained from one injection of the procaine solution.

Stimulation of long muscles innervated from several segments—for example, the sacro-spinales—gives pain over a wide area of the back, with little reference to the front of the body (Kellgren, 1938). Chronic tension in these could account for those cases in which tenderness was not found in the interspinous tissues. In these, the tenderness was most frequently discovered in the attachments of the muscles, and presumably was due to prolonged traction.

The mechanisms of these pains are functional ones, but they will increase symptoms from organic lesions should these be present. Russell (1949), for example, pointed out that backache from organic cause might be aggravated or perpetuated by emotional states, many of which he believed were the result of the attitude adopted by the medical attendant—an attitude often due to his incomplete initial assessment of the case.

It has been shown elsewhere (Robinson, 1953 and 1954) that when emotional states contribute to physical disorder, the result is brought about by physiological means. There the diseases discussed were visceral, and possible nervous pathways were depicted, passing from the prefrontal cortex to the hypothalamus, from whence autonomic fibres passed to the organs concerned. Emotional tone is believed to be maintained by the continued passage of impulses, to and fro, around certain circuits involving cortical and subcortical structures. One such is from the prefrontal cortex through the cingulum, the hippocampus, the hypothalamus and back to the prefrontal region. Another includes the hypothalamus, the thalamus and the reticulum formation, and in man lesions in these structures "may produce emotional palsy, i.e., loss of emotional exteriorization, while volutional control of the muscles used in emotional expression remains intact" (Wright, 1952). In the language of cybernetics, encoded messages may be fed in to these reverberating circuits at various points, and results, still in code, may be relayed to others. When emotional changes cause visceral phenomena, delivery is by the autonomic nerves or pituitary hormones and the decoding takes place in the organ concerned. In the case of muscle tension the cortico-spinal tracts probably form the main pathway for these messages, although the autonomic nerves may be involved.

Psychological Aspects.

Borland and Corr (1943), studying backache in an American service hospital, considered 17·7% of their cases to be purely psychogenic; while as early as 1910, Clifford Allbut had regarded occipital headache as being due to muscular strain on the occipital aponeuroses, and had related it, with the backache, the localized and diffuse areas of tenderness and the coccygeal pain, to a nervous state.

The next question to be asked is, therefore: have these patients any common personality patterns, or do they find themselves in dilemmas sufficiently characteristic to be of aid in history-taking or in treatment?

Flind and Barber (1945) found that such patients in a Royal Air Force Rheumatic Treatment Centre frequently had a family history of neurosis and had had neurotic traits in early life. They had morbid fears about health, and they succumbed frequently to minor ailments with an hysterical elaboration of symptoms.

Grace and Graham (1952) observed that low back pain "occurred when an individual wanted to carry out some action involving movement of the whole body. The activity which such patients were most commonly thinking about was walking or running away". They suggest that this pain is from tension in the lumbar muscles, which fix the spine in preparation for an escape that is rarely attempted.

Holmes and Wolff (1952) believe that skeletal muscle hyperfunction in patients with backache occurs because their defence against insecurity is to be constantly ready to take action against potential threats or assaults. This pattern of behaviour was laid down in childhood, when they learnt that "doing things well" won approval, and performance thus became equated with feelings of security. If these were threatened, the reaction was either that of active aggression, as by tantrums or fights, or by passive acceptance, by being well behaved and compliant. As in the child, so in the adult, and Holmes and Wolff define two groups, an active and a passive, the former being the larger. They describe "active, anxious, restless people who tolerate idleness and inactivity poorly. Basically immature, insecure, sensitive and dependent, they are quick to react to life situations which threaten their security with intense feelings of resentment, frustration, hostility, humiliation and guilt. They are often unable to give expression to their hostile feelings. Rather, they keep them in and ruminate for days over their difficulties without being able to take decisive action to remove the threat to their integrity and resolve the conflict. These patients have an excessive need for praise and approval, and often become petulant and demanding or even angry in their attempts to extract sympathy and support from those upon whom they are dependent for their security." The passive ones as adults "become shy, permissive, withdrawn non-participators in the competitive life that engulfs them". However, they too use the "action patterns" for protection against the many threats to their security. Thus, they are often neat and meticulous, "doing for others" and "carrying heavy burdens of responsibility without complaint". They, too, are comforted by praise and are quick to take offence if they feel they are "being imposed upon".

If the anxiety syndrome is defined, after Grace and Graham (1952), as consisting of apprehension *plus* tension and "of a feeling that something bad will happen, together with an urge to do something . . . even though there is no very clear idea what to do", the matter becomes still clearer. The patient is tensed for action that is rarely formulated and never consummated.

Discussion.

When the cases were divided into the groups described by Holmes and Wolff (*vide supra*), it was found that 62 could be placed in their active group and 38 in their passive group. There remained 40 others. These may represent a true intermediate group, so that all varieties of personality from this point of view were seen. The classification becomes an artificial one—as when, for example, carcinomata are stated to occur at the upper and lower ends of the œsophagus and in the middle. On the other hand, it may be because the assessment was based on short-term clinical impressions, and because, as was stated earlier, many patients were examined before the relationship between emotional factors and this syndrome was appreciated. The groupings, however, appear to be true and useful ones, although they do not necessarily apply to all cases.

Tegner, O'Neill and Kaldegg (1949) state that "to these patients their suffering is somewhat very personal and valuable; it makes them important, interesting and worthy of sympathy and is a protection against an unkind world". Their symptoms were described with an undercurrent of satisfaction which was regarded as evidence of masochism. In the present series, this was most obvious in the more passive and dependent patients, but was demonstrated also by the active and aggressive ones in their exaggerated reaction to minor painful procedures. Masochism is a feminine trait, and this may have a bearing on the considerable preponderance of females over males, the numbers being 115 and 25. This ratio was roughly the same in all groups.

In many of the cases it was possible to speculate on the reasons for the localization of the symptoms to one or the other part of the body. Halliday (1937) discussed the symbolical significance of the various parts affected, and also such emotional associations as those of the left submammary region with the heart, and the back with the uterus. He drew attention, too, to the aptness of such terms as "stiff-necked", "feeling stiff or sore", "spineless"

or "bowed down". The importance of functional postural defects also was obvious, and these either were defects due to general rigidity or were related to occupation—for example, pain in the right shoulder in the tense, tired accountant. As might have been expected, symptoms were much more frequent in the occiput, shoulders and thorax in the alert, active group, and in the lumbar region and abdomen in the passive group. In this series, the perpetuation of symptoms following an injury, or the diagnosis of illness was more commonly due to anxiety than to hysteria, since "compensation cases" were excluded.

If it is borne in mind that the symptoms as stated are an anxious patient's interpretation of the results of muscle tension, and that there are no well-known or stereotyped medical descriptions for these, the allusions to tight bands, weights, numbness and tension, or to indescribable sensations, become intelligible and not inappropriate. Nor from what has been mentioned earlier can the lumps and swellings they describe be regarded as entirely fanciful. Such, too, may be the case with the "bizarre" clickings, stabs and movements described by other anxious patients if their mechanisms were understood. Of course such statements as "it is as if my ovary were hanging by a thread" must be the result of hysteria or ignorance.

It is important to realize how varied may be the presenting complaint. There is no diagnostic difficulty when the main symptoms are nervous and the various aches and pains are in obvious association. Nor should there be any problem if the history is simply one of backache, anterior thoracic pain or headache, provided that the chronic anxiety symptoms are not overlooked. This omission occurs most commonly if organic change is found in the vertebræ, or if there has been previous physical injury. The cases most frequently misdiagnosed are those of chronic abdominal pain without backache, and it is in these that rewardless operations are so often performed. In all cases axial tenderness should be sought for in the manner described, so that referred pain can be distinguished from other forms by the use of procaine infiltration.

TREATMENT.

Before treatment is attempted, the true nature of the disorder must be realized. It is nervous reaction, in which the manifestations are mainly those of anxiety. One of these is pain due to muscle tension. The part of the body affected depends on a variety of causes, of which previous illness or injury, posture, occupation, basic conflicts, personality pattern and symbolical significance are all important.

The treatment must be primarily that of an anxiety state, though the approach should be a combined one. Treatment without psychotherapy will fail. Thus orthodox physical methods frequently aggravate the symptoms, or else by pandering to the patient's masochism further bind him to them. At best they give only temporary relief.

Psychotherapy.

The aim of psychotherapy is to aid the patient to rid himself of his tensions by providing him with the opportunity to air his problems and feelings freely. This is not difficult, especially if the behaviour and personality patterns and the common dilemmas are known. The method that appears most successful is a non-directive one. Its application to such problems as this and to their treatment in general practice has been set out by Jansen (1954). However, passive or unintelligent patients may require more directive measures.

Drug Therapy.

There is no reason why simple analgesics should be withheld, especially if they are combined with a suitable sedative. "Butazolidin" is of value in some cases.

Of more interest are the recently introduced centrally acting relaxants such as chlorpromazine and methylpentynol. These cannot remove basic conflicts, but by relieving the nervous tension they ease its manifestation—the pain—and thus make psychotherapy and alterations of stressful environmental situations easier. They are of most value for the more tense patients. When depression is the main feature, amphetamine is useful.

Physical Methods.

Simple active exercises of the affected muscles are of great value, and especially so for patients with postural defects or those whose work involves specific muscle groups. Procaine injections are also useful, but occasionally fail to give relief in an apparently suitable case.

Combined Therapy.

As these symptoms have multiple causes, a therapeutic approach which uses all the above methods seems the most rational. A further advantage is that, although most patients soon realize that nervous tension is an important factor in their illness, many seem to fear or resent the implication that in their case help for this need or can be given. A course of procaine injections may then provide the excuse for regular visits, during which psychotherapy can be undertaken without exciting the distress or resentment that this otherwise may arouse.

In the great majority of cases this method is both easy and successful, and usually only three or four visits seem required, despite the necessarily superficial nature of the psychotherapy. Least success will be obtained with patients who gain most benefit from their symptoms—that is, those with hysterical features, and especially if they are "compensation" patients. These may need treatment by a psychiatrist.

SUMMARY.

One hundred and forty patients, of whom 25 were males and 115 females, are described, who complained of chronic pain of the type usually regarded as being due to such organic conditions such as fibrositis or spondylitis, or to the effects of trauma.

In all tender focal areas were found over the attachments of the anti-gravity muscles. These were most common in the paravertebral tissues. They were frequently associated with local pain, but they also gave rise to radiculitis with referred pain, hyperæsthesia and soft tissue swelling, so that cranial, intrathoracic and abdominal disease was often simulated. These manifestations could be relieved temporarily by procaine infiltration of the primary focus.

In all cases associated nervous symptoms were recorded. The commonest of these were tension, tiredness, irritability and depression—that is, symptoms of an anxiety state. The cause of this was frequently found to be a chronic emotional conflict acting in a soil prepared by emotional deprivation in childhood.

The tenderness and local pain were considered to be the result of tension of skeletal muscle, itself the result of the emotional disturbance, and the radiculitis was considered to be the result of a secondary perivertebral disturbance. The familiar allusions to tight bands, weights, numbness and tension or to indescribable sensations appear to be the anxious patient's interpretation of this state, which is one for which there is no well-known or stereotyped medical description.

Psychologically, the patients appeared tensed for an action that was rarely formulated and never consummated. This dilemma might be met either aggressively or passively. When it was met aggressively, the symptoms were largely referred to the upper parts of the body; when it was met passively, to the lower. Other factors influencing the localization of symptoms were previous illness or injury, posture, occupation and symbolical significance.

The treatment must be that of an anxiety state, although psychotherapy may be usefully supported by the usually employed physical and therapeutic measures. Relief of symptoms by this combined approach is usually rapid.

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A TRIAL OF "TRANSITAL" (A SHORT-ACTING INTRAVENOUS ANÆSTHETIC).

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BUTHALITONE SODIUM — sodium 5-allyl-5-isobutyl-thiobarbiturate—was first prepared and described by Miller (1936) and was passed over by German anæsthetists in favour of hexobarbitone sodium. It has been reexamined as an ultra-short-acting intravenous anæsthetic agent, and although it is not on the market as yet, some clinical trials have been carried out by the anæsthetic department at the Repatriation General Hospital, Heidelberg.

A single dose of "Transital" gives adequate anæsthesia for periods varying from two to five minutes, though anæsthesia can be continued at will by repeated doses.

Chemical Properties.

"Transital" is presented as a creamy-yellow hygroscopic powder, aqueous solutions of which have an alkaline reaction. It has been found in these trials that solutions should not be stored; if they are left standing for an hour or longer they lose most of their efficiency. It is advised that a fresh solution be made for each application.

Presentation.

The ampoules used contained 0·5 or one gramme of solid, being made up of 100 parts of thiobarbiturate with six parts by weight of anhydrous sodium carbonate.

From our experience here it was found that there was little or no use for 0·5 gramme ampoules, since most patients were well-built adults, and in several cases this dose was not sufficient to give even sleep.

A 10% solution was used as advised by the makers and as shown in Weese's original applications of this substance.

Animal Studies.

Original tests on the pharmacology were carried out by Weese and Koss (1954) on dogs and rabbits, the dose being arranged according to the kilogram weight of the animal concerned. The following were the main points brought out during this research: (i) The duration of anæsthesia was similar to that of hexobarbitone sodium, but the recovery phase was shorter. (ii) Average doses were in a range of 40 to 50 milligrammes of "Transital" per kilogram of body weight. (iii) Little or no effect on the blood sugar content was noted. (iv) Repeated daily doses could be given to the same animal without any untoward effects. (v) By a heart-lung-liver preparation in the dog, "Transital" was rapidly detoxified by the liver, no more than one twentieth of the full anæsthetic dose being detectable in the urine. (vi) In the rabbit the elimination was so rapid that eight intravenous doses could be given in the same day, with only slightly prolonged recovery time in the two final injections.

Clinical Studies.

Weese and Koss (1954) and Nobes (1955) carried out clinical studies on patients with a view to proving the short-acting properties of "Transital". In this department the following procedure was adopted, run on parallel lines to the studies of Weese and Koss.

Some 88 patients were given "Transital". All were in-patients of this hospital, though their tests included ambulation in an effort to judge the post-operative confusion and drowsiness that are factors in the use of thiopentone.

The details of procedures in which "Transital" was used are as in Table I.

TABLE I.

Procedure.	Number of Cases.	Procedure.	Number of Cases.
Cystoscopy	18	Manipulations	30
Shock therapy	21	Dental extractions ..	4
Incision of abscess ..	11	Inductions	4

No premedication other than atropine (one-hundredth of a grain) was given, since it was thought that the anæsthetic effects might be prolonged.

The blood pressure was recorded carefully in almost every case, and a definite fall, though not of dangerous proportions, was almost invariably noted; the fall was in the region of 10 to 20 millimetres of mercury, and the pressure returned to normal by the time the patient was leaving the operating theatre.

It was also noted that there was a depression of respiration of a shorter duration than would be encountered with thiopentone, and in no cases was apnœa of any duration noted.

A 10% solution was used, made up for immediate use. Attempts were made to use solutions that had been made up and stored in the refrigerator from one hour up to twenty-four hours earlier, and it was found that the efficiency of the "Transital" diminished rapidly after one hour. One patient (weighing 11 stone 11 pounds), who was to have a manipulation of the knee, was given 1·5 grammes of a 5% solution twenty-four hours old, and was just able to carry on a conversation throughout.

It was also found that if the "Transital" solution was injected slowly it was apparently broken down so quickly that a well-built patient might go to sleep, but was not sufficiently anæsthetized for surgical interference of any kind.

In the preparation of the solution, "Flaxedil" was freely miscible. "Tubarine" and "Scoline" were also miscible provided there was a considerable excess of "Transital".

The average dose to produce sufficient anæsthesia in a man weighing 10 stone was 0·8 gramme given as fast as reasonable; this gave an average of two to three minutes' anæsthesia.

Of all the cases in which we tried the method, the first one was probably the most enlightening.

This man weighed 11 stone 12 pounds, and was to have a check cystoscopic examination; our object was to anæs-

thetize him only while the instrument was passed. Twenty seconds after the injection was started he had received 0·2 gramme and by thirty-five seconds he was asleep, the instrument being passed without trouble by one minute. Having been asked to count, he reached 21 before falling asleep. At one and a half minutes we attempted to rouse him, and by one and three-quarter minutes he was continuing to count 22 onwards as though he had never stopped. He was fully awake on return to the ward, with the result that sister did not watch him particularly, and he, having had a cystoscopic examination and feeling a full bladder, promptly got out of bed and walked the length of the ward to pass urine, without even a rolling gait.

For shock therapy, "Transital" was used in conjunction with "Scoline" and "Brevidil-E", and the patients were very closely questioned after operation as it was feared that the "Transital" might wear off before the "Scoline". No patient had any recollection of difficulty in breathing, though one or two tended to show attempts at movement. There was no doubt whatever that the patients were awake and able to carry on a sensible conversation very much sooner than after the use of thiopentone; they were also able to walk back to their beds almost immediately. However, the ward sister indicated that she would rather see thiopentone used for these patients, as the post-operative sedation allowed the patients to sleep for some time after the shock therapy, though when ambulation and clear thinking were required as early as possible, "Transital" had considerable advantage.

One important use of "Transital" was for the incision of abscesses. In this case we had the help of one of the resident medical officers who happened to have an abscess which required incision, and he was able to give a clear and detailed account of his impressions. After the operation the same routine was followed as with the cystoscopic examination, and he was awake as the dressing was being applied. It had been noted on several occasions that the first big breath or so after the initial respiratory depression tended to be stertorous in quality, and we had thought that laryngeal spasm might follow; in fact, we expected it when we cut the dose down to a minimum. However, laryngeal spasm never occurred in any of the cases; the resident medical officer concerned had stertorous breathing for approximately a minute, although afterwards he could not remember any impression whatsoever of difficulty in breathing.

Probably the main application of "Transital" was in short manipulations and the reduction of dislocations. Since most of the patients were well built, we soon found that manipulation of the spine needed more anæsthesia, and we confined our application of "Transital" to manipulations of the neck, arm, knee, leg and foot, with excellent results. One or two dislocations were replaced under "Transital" anæsthesia, although in the reduction of a dislocated elbow we found ourselves having to give repeated doses which finally ended with a relaxant and some thiopentone.

Another application of "Transital" was in the removal of teeth. Unfortunately the cases in which general anæsthesia was indicated and the patients adequately prepared for it were so limited that we had experience of only four; the results were excellent within the limits of its application—this is for simple tooth extraction only, the patients being awake within two minutes and capable of clearing the throat at once.

It is considered that this drug should be examined much more fully before being used in a dental clinic for patients who require to return home as soon as possible after the extraction.

In four cases "Transital" was used purely for induction of anæsthesia in sick patients to give the opportunity for the employment of a very small dose; the anæsthesia was carried on immediately with nitrous oxide and relaxants, endotracheal tubes being passed at once with the use of "Scoline". Although it was almost impossible to be certain how efficacious this was, the results from the anæsthetist's point of view were excellent.

It is held very strongly that "Transital" should never be used except in circumstances in which all equipment is available to deal with an emergency; this includes a sucker, oxygen inflation apparatus, a laryngoscope and an endotracheal tube. Though this equipment was always available in the present series of cases, we are glad to say that other than routine inflation of the patient's lungs with oxygen they were not needed.

This research into the uses of "Transital" is only partially complete, inasmuch as it has been really applied only to men, and in most cases strong healthy ones. One woman only was given "Transital", though no effects other than a reduction in dosage were anticipated. No children have been given the drug, and it has not been used for basal narcosis. There must be many other applications in anæsthetics in which "Transital" might prove of considerable assistance.

Fortunately no experience of extravenous injection was encountered. However, it is held that even with such an alkaline solution there would be less sclerosing of tissue and finally less sloughing owing to its close relationship with hexobarbitone sodium.

Summary.

1. A clinical trial covering 88 cases of a new short-acting intravenous anæsthetic agent, "Transital", has been made.

2. It was found that a single dose of "Transital" gave adequate anæsthesia lasting for two or three minutes.

3. There was a small fall in blood pressure and also depression of respiration, which soon returned to normal.

4. The patients were able to talk sensibly after five minutes, and in most cases were able to walk unaided within fifteen minutes.

5. No untoward effects, signs of toxicity or other complications were noted.

6. "Transital" was found to give adequate anæsthesia for such minor procedures as the passing of a cystoscope, incision of abscesses, shock therapy, minor manipulations, and single tooth extractions.

7. "Transital" was found to give insufficient anæsthesia for major manipulations, dental clearances and procedures in which muscular relaxation was required.

Acknowledgements.

My thanks are due to the Chairman of the Repatriation Commission for permission to publish this article, and to my colleagues on the visiting and whole-time staff of the Repatriation General Hospital, Heidelberg, for their help in dealing with the patients. The makers, May and Baker (Australia), Proprietary, Limited, have given us supplies of "Transital", and have done everything they could to help with this series of cases.

PREDNISONE IN CHRONIC ARTHRITIS: EARLY IMPRESSIONS.

By MICHAEL KELLY,
Melbourne.

MANY workers in America and Europe have reported that prednisone is four times as effective antirheumatically as cortisone, and it does not cause retention of fluid (see Hart *et alii*, 1955, for early references). Chemically it differs from cortisone only in having an extra double bond in one of its benzene rings.

I have tried it on 38 patients with rheumatoid polyarthritis, six with osteoarthritis, five with gout, and 21 with local or multiple non-articular pains presumed to be of rheumatic origin.

Dosage.

The first two patients had severe rheumatoid polyarthritis (Table I, Cases 1 and 15). Through a misunder-

TABLE I.

Details of 63 Courses of Treatment in 45 Rheumatic Patients Effectively Treated with Prednisone.

Table Ia.—Forty Courses in 27 Patients with Rheumatoid Arthritis.

Case Number, Sex of Patient.	Age (Years); Duration of Disease. (Years.)	Clinical Details.	Daily Dose. (Milligrammes.)	Duration of Treatment. (Days.)	Residual Pain and Swelling. (Percentage of Original.)	Complications; Remarks.
1: F.	48: 10	Continuous pain in flexed fingers; wrists and knees swollen; shoulders stiff. Cortisone failed. Blood pressure 220 millimetres of mercury, systolic, and 140 millimetres, diastolic. Two courses of treatment.	(i) 15 (ii) 10	(i) 30 (ii) 50	(i) 0 (ii) 10	Blood pressure fell, then rose; popliteal abscess after 30 days; 28 days' break; disappeared after 80 days.
2: F.	36: 4/12	Pain in hands and feet; slight swelling of metacarpal and metatarsal joints. Relieved by "Butazolidin", but relapsed — depressed.	15 12·5 10 to 0	14 7 105	0 0 0 0	Depression relieved.
3: M.	56: 12	Polyarthritis with flexion deformities of hips, knees and wrists; swelling. Blood pressure 170 millimetres of mercury, systolic and 110 millimetres, diastolic.	15 12·5	52 63	20 0	Blood pressure rose to 230 millimetres of mercury, systolic, and 140 millimetres, diastolic.
4: F.	59: 2	Painful swelling of wrists and feet. Colostomy for six years. Three courses.	(i) 10 (ii) 15 (iii) 20	(i) 56 (ii) 35 (iii) 21	(i) 20 (ii) 0 (iii) 0	Two relapses; two breaks of 14 days. Headache and nausea before second relapse.
5: M.	49: 2/12	Rapidly advancing polyarthritis. Wrists and shoulders especially painful. Blood pressure 190 millimetres of mercury, systolic, and 120 millimetres, diastolic. Weight, 15 stone 11 pounds.	15 12·5 20 15	16 37 38 21	0 30 15 15	Partial relapse on 12·5 milligrammes per day.
6: M.	57: 4	Arthritis of hands, shoulders, right ankle and knee. Two courses.	(i) 15 (ii) 20	(i) 42 (ii) 47	(i) 10, 60 (ii) 10	All subsided; then relapse. Fifty days' break.
7: M.	48: 8	Stiff shoulders, swollen knees, wrists and elbows. Muscular stiffness.	15 10	105 42	0 0	Swelling and general stiffness disappeared.
8: F.	71: 5	Arthritis of wrists, shoulders, knees, . . ., relieved by cortisone February to November, 1954; lethargy persisted. Increase of weight.	15 10	46 49	0 0	Lethargy vanished. Lost 10 pounds.
9: F.	46: 18	Arthritis of wrists, knees, hips (nearly ankylosed). Two courses.	(i) 15 (ii) 5	(i) 2 (ii) 120	(i) 100 (ii) 50	Headaches first trial. Thirty days' break. Partially relieved by 5 milligrammes per day.
10: F.	45: 5	Arthritis of wrists, shoulders, ankles relieved by "Butazolidin", but complications developed. Prednisolone in second course.	(i) 15, 10 (ii) 20	(i) 3, 14 (ii) 58	(i) 10, 15 (ii) 10	Epigastric pain first trial; 50 days' break.
11: F.	47: 9	Painful swelling of wrists, left knee and feet; shoulders stiff.	15 to 5 10	120 42	0 15 5	Nausea on 15 milligrammes. Partial relapse on 5 milligrammes controlled by increase.
12: F.	35: 8	Pain in hands with swelling of wrists and a few fingers. "Butazolidin" caused mental depression.	10 7·5 5	18 7 146	0 0 0	Slight relapse on 5 milligrammes overcome by increase to 10 milligrammes for four days.
13: F.	52: 4	Swelling of wrists, hands, right knee. Stiffness of shoulders. "Butazolidin" helped for eight months. Cortisone helped for three months, but patient relapsed on 62·5 milligrammes per day. Two courses.	(i) 15, 10, 7·5 (ii) 15	(i) 4, 44, 82 (ii) 56	(i) 0, 0, 50 (ii) 0	Sudden relapse after 120 days; 14 days' break. Duodenal ulcer at second trial.
14	51: 10	Polyarthritis suppressed by "Butazolidin", 100 milligrammes per day for two years. Sudden relapse; unresponsive to 400 milligrammes per day. Patient helpless with acute flare all over.	15 10	3 7	0 0	Dramatic relief; then successful with "Butazolidin".
15: F.	52: 3	Severe polyarthritis partially suppressed by cortisone, 75 milligrammes daily for fourteen months. Moon-face; mental depression.	20 15	14 142	0 10	Face and mental state became normal.
16: M.	51: 4/12	Pain and swelling of hands and right ankle. Two courses.	(i) 10, 7·5, 5 (ii) 15	(i) 14, 16, 30 (ii) 22	(i) 0, 0, 40 (ii) 15	Relapse relieved by "Butazolidin" for eight weeks only.
17: F.	37: 1½	Pain and swelling of hands and feet, stiff neck, back. Two courses.	(i) 15 (ii) 15, 10	(i) 8 (ii) 20, 49	(i) 0 (ii) 5, 10, 60	"Butazolidin" partially relieved twice. Second relapse after epidemic enteritis.
18: F.	42: 2	Severe polyarthritis; pain with swelling of wrists and feet. Shoulders painful and stiff. Blood pressure 180 millimetres of mercury, systolic, and 120 millimetres, diastolic. Prednisolone in third course.	(i) 20, 15, 10 (ii) 20 (iii) 20	(i) 7, 15, 24 (ii) 14, 20 (iii) 104	(i) 0, 10, 50 (ii) 40, 30 (iii) 20, 40	Relapse on 10 milligrammes Epigastric pain on 20 milligrammes. Third trial failed.
19: M.	44: 1	Pain and swelling of knee, wrist and ankle. Cortisone for four months reduced pain to 20%; lowest dose 37·5 milligrammes daily.	15 7·5 5 2·5	7 24 100	0 0 0	Complete relief.
20: F.	60: 3	Severe polyarthritis with stiffness and muscular wasting. Cortisone helped, but had to be stopped after nine months.	15	51	0	Quality of relief better than with cortisone.
21: F.	31: 3/12	Pain and swelling of hands; painful shoulders. Two courses.	(i) 20 (ii) 20	(i) 28 (ii) 14	(i) 10, 60	Relapse after 26 days; 14 days' break. Second trial failed.

TABLE I.—*Continued.*

Details of 63 Courses of Treatment in 45 Rheumatic Patients Effectively Treated with Prednisone.—Continued.

TABLE Ia.—Forty Courses in 27 Patients with Rheumatoid Arthritis.—*Continued.*

Case Number, Sex of Patient.	Age (Years); Duration of Disease. (Years.)	Clinical Details.	Daily Dose. (Milligrammes.)	Duration of Treatment. (Days.)	Residual Pain and Swelling. (Percentage of Original.)	Complications; Remarks.
22: M.	47: 6/12	Pain and swelling of knees, wrists. "Butazolidin" helped for a time.	20	35	0	Complete relief.
23: F.	58: 8	Generalized flare after remission for two years.	10	35	0	Epigastric pain after two weeks.
24: M.	52: 8	Swelling of knees and wrists; extreme stiffness of shoulders. "Butazolidin" for a year; swollen feet.	20	10	10	Swelling of feet went; tachycardia after 10 days; resumed "Butazolidin".
25: M.	65: 3	Almost bedridden with painful stiffness of many joints. "Butazolidin" for 11 months. Congestive cardiac failure with œdema of legs.	15	60	10 60	Œdema went in three days. Gradual relapse.
26: M.	29: 1/12	Rapidly advancing polyarthritis. Two courses.	(i) 15, 10 (ii) 20	(i) 14, 7 (i) 14	(i) 0, 50 (ii) 60	Relapsed on 10 milligrammes; two weeks' break; second trial failed.
27: F.	40: 2/12	Pain and swelling of wrists and hands.	15 10	2 28	20 100	Gradual relapse; then cured by "Butazolidin".

Table Ib.—Eight Courses in Six Patients with Osteoarthritis.

28: F.	60: 20	Knees like balloons for many years. Blood pressure 170 millimetres of mercury, systolic, and 110 millimetres, diastolic. Weight 14 stone 12 pounds.	20	65	10	Steady reduction of swelling almost to nothing.
29: F.	59: 8	Hips painful. Cortisone and injected hydrocortisone failed. Blood pressure 220 millimetres of mercury, systolic, and 140 millimetres, diastolic. Two courses.	(i) 15, 10 (ii) 15	(i) 4, 101 (ii) 30	(i) 0, 60 (ii) 40	Lost four pounds. Blood pressure fell, then rose; relapse after 95 days. Second trial failed.
30: F.	62: 1	Pain in hip reduced to 25% by "Butazolidin", 200 milligrammes daily; gained five pounds.	10	35	30	Lost five pounds. Resumed "Butazolidin".
31: F.	69: 3	Painful stiffness and enlargement of knees. Blood pressure 190 millimetres of mercury, systolic, and 120 millimetres, diastolic.	(i) 15 (ii) 15	(i) 14 (ii) 17	(i) 0 (ii) 0	Relapse after stopping medication.
32: F.	54: 2	Pain and swelling of knees. On "Butazolidin" gained 10 pounds in 21 days.	15 10	2 33	20 35	Lost 11 pounds. Discontinued (expense).
33: F.	56: 6	Painful stiffness of hips; helped by "Butazolidin" for two years.	15 10	14 7	10 50	Relapse. Discontinued.

Table Ic.—Four Courses in Four Patients with Gout.

34: M.	50: 20	Swollen feet, knees and wrists for four months continuously; incapacitated.	10	14	0	Complete relief; no recurrence in six months.
35: M.	65: 6	Feet continuously painful and swollen for six months. Obesity (15 stone 11 pounds). Inguinal hernia.	20 15	92 51	0 0	Abdominal pain at beginning relieved by truss.
36: M.	53: 5	Pain and swelling of left knee, right elbow, wrists and hands.	15 12·5 10 20	20 7 28 49	0 60 0	Nodules on ulna vanished. Partial relapse overcome by increase.
37: M.	54: 18	Continuous gout in knees, ankles and toes for three months. Incapacitated.	20 15	81 21	0 0	

standing the patient in Case 1 took 10 milligrammes daily and was very much improved—as was the patient in Case 15 with 15 milligrammes daily. In the four succeeding cases I was tempted to give an initial daily dose of 10 milligrammes, but no benefit ensued. Ten other patients who commenced treatment with 15 milligrammes per day and reduced the dose to 10 milligrammes after two days were relieved, but soon relapsed.

Twenty-nine patients began with 15 milligrammes per day and persisted with it for several weeks before the dose was reduced to 12·5 and 10 milligrammes. Eighteen relapsed after relief lasting from three to twenty weeks; 15 of these had second or third trials with prednisone after interruptions of two to eight weeks. The last nine patients had a commencing dose of 20 milligrammes per day; and this dose was given to the last five who had second or third trials (Cases 4, 6, 10, 18, 26).

Therapeutic Effects.

In 27 out of 38 patients with rheumatoid arthritis, the pain and swelling were almost completely relieved within two days and the range of movement was increased. Most of the others would probably have been relieved if they had had correct doses. Nineteen of the 27 are still under treatment after six to twenty-six weeks, and eight dropped out—four suffered relapses, two resumed "Butazolidin" therapy with success (Cases 14 and 27), one disappeared when doing well (Case 1), one had a complete remission after the dose was tapered to nothing (Case 19).

In two patients with severe osteoarthritis of the hip (Cases 29 and 33) the pain and stiffness nearly vanished, but the symptoms relapsed after six and fifteen weeks; another patient (Case 30) took the drug for a short time in order to reduce her weight, which had increased while she was taking "Butazolidin". Two patients with painful

TABLE I.—*Continued.*

Details of 63 Courses of Treatment in 45 Rheumatic Patients Effectively Treated with Prednisone.—Continued.

TABLE II.—Eleven Courses in Eight Patients with Local or Multiple Fibrositis.

38: F.	52: 11	Polyarthritis which subsided but left multiple pains in joints.	15 to 7·5	5 5 96	0 0 5	
39: F.	49: 6	Severe pains in neck, shoulders and hands. Unsuccessful trial of "Butazolidin". Obesity. Blood pressure 180 millimetres of mercury, systolic, and 110 millimetres, diastolic.	15 to 5 15	73 25	0 60 40	Lost six pounds. Blood pressure fell. Relapse not controlled by increase.
40: F.	40: 5	Headaches, backaches, pains all over. Relieved by "Butazolidin", but severe relapse. Blood pressure 180 millimetres of mercury, systolic, and 110 millimetres, diastolic. Two courses.	(i) 15, 10 (ii) 15	(i) 17, 31 (ii) 95	(i) 0, 40 (ii) 0	Eleven days' break; blood pressure fell.
41: F.	54: 8/12	Pains in shoulders with numbness of hands. Blood pressure 170 millimetres of mercury, systolic, and 110 millimetres, diastolic.	(i) 15, 10 (ii) 15, 5	(i) 7, 27 (ii) 58	(i) 30, 20 (ii) 15, 0	Relapse after first stoppage. Cured.
42: F.	26: 8	Pains in neck, shoulders, arms and back.	(i) 15 (ii) 15	(i) 10 (ii) 17	(i) 0 (ii) 0	Relapse after stopping medication.
43: M.	50: 7/12	Right sciatica.	20	60	15 0	Cured.
44: F.	42: 2/12	Painful hands; frozen left shoulder. "Butazolidin" increased weight by five pounds.	15 12·5 to 5	14 84	0 0 0	Lost five pounds.
45: F.	38: 5/52	Sciatic pain.	20	21	0	Cured.

osteoarthritis of the knees (Cases 28 and 31) have been greatly relieved; in one gross distension of both knees subsided in eight weeks, and the other is doing well after six weeks.

One of the five patients with gout remembered that he had had a perforated duodenal ulcer and could not proceed. One secured a complete remission after two weeks (Case 34); the other three remain completely relieved but still under treatment after twenty-six, nineteen and fourteen weeks (Cases 35, 36 and 37).

Of 21 patients with local or multiple pains of various kinds, 13 failed to respond. Five with severe multiple arthralgia were completely relieved; one relapsed after ten weeks and another after four weeks (Cases 39 and 42). The other three remain under effective treatment after eighteen, twenty-three and fourteen weeks (Cases 37, 40 and 43). Two patients with sciatic pain were cured after taking the drug for a few weeks (Cases 43 and 44); and one with radicular pains in the arms was cured (Case 41).

Other Effects.

So long as their rheumatic symptoms were relieved the patients felt well and complained of few toxic effects. Euphoria was not encountered, though it and other psychotic effects have been reported after higher doses (Bollet *et alii*, 1955*a*; Cohen *et alii*, 1955; Margolis *et alii*, 1955; Plotz, 1955). Two patients who had been taking cortisone for long periods were glad to be relieved of the "jittery" feeling which accompanied it (Cases 15, 19). In Case 15 the "moonface" returned to normal. Five others who had previously had to abandon cortisone because of its metabolic effects declared that prednisone was greatly superior (Cases 1, 8, 13, 20 and 29).

Ten patients complained of nausea, heartburn or epigastric pain in the first three weeks. In only three (one of whom had been operated on for a perforated duodenum in 1939) was it severe enough to stop treatment. After higher doses gastro-intestinal ulceration with perforations and hæmorrhages has been reported (Bollet *et alii*, 1955*a*; Gluck *et alii*, 1955; Margolis *et alii*, 1955; Plotz, 1955).

The weights of eight patients decreased by three to nine pounds in the first two weeks of prednisone treatment. Four of these had had fluid retention due to "Butazolidin"; one had congestive heart failure (Case 25); in Case 8 cortisone had been responsible for excess fluid. Prednisone did not increase the weight of any patients, though higher doses have been reported to do so (Gluck *et alii*, 1955). Others have reported that cardiac œdema was diminished (Bollet *et alii*, 1955*b*; Kersley, 1955; Rodnan, 1955).

In nine patients the systolic blood pressure had been 180 millimetres of mercury or more. In three it fell by 20 millimetres after two weeks; in two of these it later rose to its previous level. In Case 3 the systolic blood pressure has risen from 170 to 230 millimetres of mercury. One patient, aged fifty-two years, with normal blood pressure, abandoned the drug after ten days because of palpitations (Case 24).

One patient who developed popliteal cellulitis after thirty days resumed treatment after an interruption of six weeks (Case 1). Another developed paronychia of both great toes in the first two weeks, and several patients had mild pustular eruptions. In a diabetic patient, aged forty-seven years, the glycosuria was so much worse that treatment was abandoned within a few days. Other writers have reported an increased liability to infection (Savage, 1955; Plotz, 1955) or phlebitis (Kammerer, 1955).

It is not known yet whether prolonged prednisone treatment in these doses has metabolic disadvantages like those which follow prolonged administration of cortisone. Slocumb (1955) states that it may cause osteoporosis, and West (1955) and Black *et alii* (1955) state that continued administration suppresses the adrenal gland. However, De Gennes and Mathieu (1955) state that it is of no use for replacement therapy in adrenal cortex hypofunction.

Relapses.

The greatest disadvantage of prednisone appears to be the liability of patients to relapse when the dose has not been reduced and the symptoms have been suppressed for many weeks. This liability seems greater on doses of 15 than on 20 milligrammes per day. But other writers who have used higher doses have also been troubled by relapses (Dordrick and Gluck, 1955; Thompson, 1955) Boland, 1955; Kammerer, 1955).

When the patient who is taking 10 or 15 milligrammes per day shows the first signs of a relapse, the dose may be increased to 15 or 20 milligrammes for a few days. But the increased dose should not be continued if it does not give pronounced relief. It is better to withdraw the drug for two weeks and start again. If a patient taking 20 milligrammes per day relapses, the dose should not be increased, but the drug should be withdrawn for a while.

The state of unresponsiveness heralded by the relapse of symptoms is often temporary only. If prednisone is persisted with or if the dose is increased, the unresponsiveness may become intensified. However, if it is withdrawn for two weeks and recommenced at a dosage of 20 milligrammes per day the patient will often respond again.

Seventeen relapses in 15 patients have been treated in this fashion, with renewed relief of symptoms in 13 cases.

When the patient's symptoms have been suppressed for several weeks, the daily dose should be reduced by 2·5 milligrammes every two or three weeks. However, a complete remission is not likely to occur; treatment with prednisone should be commenced only in patients who can afford a prolonged course with an expensive drug.

"Butazolidin" and Prednisone.

I believe that the contraindications for "Butazolidin" and for cortisone (age over sixty-five years, previous alimentary or cardio-vascular disorders) should be strictly observed for prednisone. It is too early to say whether older patients and those with high blood pressure will be harmed by prolonged treatment with prednisone. In this series three patients aged seventy-one, sixty-nine and sixty-five years have suffered no apparent harm in seventeen, six and twenty-five weeks respectively (Cases 8, 31 and 35). The patient aged seventy-one years had been suffering for a year from lethargy and depression which had developed during cortisone treatment; her arthritis had been rapidly growing worse. A remarkable improvement in her physical and mental state has been maintained with 10 milligrammes of prednisone per day.

For 50% of rheumatic patients "Butazolidin" therapy remains the treatment of choice. In the cases in this series "Butazolidin" had failed or was unsuitable for various reasons. Four patients (Cases 14, 24, 27 and 30) resumed "Butazolidin" treatment successfully after a short break on prednisone.

It is clear that prednisone is in many ways an improvement on cortisone; but its liability to relapses seems to be its greatest disadvantage.

Summary.

In daily doses of 15 or 20 milligrammes, prednisone is as active as a four or five times greater dose of cortisone in suppressing arthritic symptoms.

It does not cause retention of fluid; rather it causes loss of fluid in œdematous patients. Its commonest undesirable effect is dyspepsia, which in these doses is seldom severe enough to cause interruption of treatment.

Its greatest disadvantage in treatment appears to be a liability to relapses after many weeks of apparently successful treatment. This can be controlled by withdrawal for two weeks, when the patient will probably respond to the original dose.

In larger doses prednisone has been reported to cause psychosis and other toxic effects like those which may follow cortisone therapy.

Acknowledgement.

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Addendum.

After a further six months, only nine of the 27 rheumatoid patients remain under treatment with prednisone or prednisolone (Cases 3, 4, 6, 7, 8, 15, 17, 20, 22). Seven (Cases 2, 11, 12, 16, 19, 23, 27) had complete remissions, and five (Cases 5, 18, 21, 25, 26) had uncontrollable relapses. Three patients (Cases 3, 8, 40) put on weight rapidly after many weeks, and five developed round faces. Three (Cases 10, 13, 23) discontinued the treatment because of gastric symptoms. Two osteoarthritic patients (Cases 28, 31), one with gout (Case 37) and none with fibrosis remain under treatment. Three gouty patients and five with fibrositis had complete remissions. Two with severe multiple pains (Cases 29, 42) had relapses which could not be controlled.

BENIGN TUMOURS OF THE STOMACH, WITH REPORT OF TWO CASES.

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BENIGN TUMOURS of the stomach are not commonly seen outside the larger centres, and the appearance of two in the space of six days in a general practice is remarkable. A brief review of the literature is given, together with the clinical reports of the two cases encountered.

Incidence.

The incidence of benign gastric tumours is variously quoted. Marshall quotes an incidence of 82 benign tumours out of 1700 cases of gastric tumour at the Lahey Clinic (4·8%). Of these 82 benign tumours, 28 (34·1%) were leiomyomata. Ker quotes Aird as stating that leiomyoma occurs once in every 2000 gastric neoplasms. Tanner found 15 simple tumours of the stomach during 1730 consecutive gastroscopies (0·86%). He quotes necropsy figures which give the incidence of benign gastric tumours as between 0·3% and 0·8%.

Types of Tumour.

The tumours may be classified as follows:

1. Tumours of epithelial tissue:
   - (*a*) Adenoma.
   - (*b*) Papilloma.
2. Tumours of connective tissue:
   - (*a*) Leiomyoma.
   - (*b*) Neurogenic tumours—neurilemmoma and neurofibroma.
   - (*c*) Lipoma.
3. Developmental tumours:
   - (*a*) Dermoid tumours.
   - (*b*) Ectopic pancreas.
4. Vascular tumours.

Of them all, the smooth muscle tumours are the commonest, the next being the neurogenic tumours.

Pathology.

The tumours vary in size from minute tumours recognized microscopically to moderately large specimens. They are firm, well defined and rounded; pedunculated or sessile; submucous or intraperitoneal. They are relatively avascular and are prone to necrosis, ulceration and hæmorrhage if submucous.

They are occasionally subject to malignant change, giving rise to tumours of relatively low malignancy, with a consequently better prognosis. The suffix "sarcoma" is frequently used to indicate malignant change—for example, "leiomyosarcoma". However, Golden and Stout (1941) suggest the use of the term "malignant leiomyoma", as the term "leiomyosarcoma" suggests a highly malignant tumour, which, apparently, "malignant leiomyoma" is not.

On microscopic examination the leiomyomata are seen to be composed of interlacing bundles of smooth muscle fibres and fibrous tissue. The nerve sheath tumours show "regimentation" or palisading of the nuclei. It is very difficult to distinguish between these two groups, as leiomyomata often show apparent regimenting of the nuclei.

Symptoms.

Marshall and Cherry (1955), in a series of 18 cases in which benign gastric tumour was the primary lesion, reported hæmatemesis as the commonest symptom, occurring in 10 of these cases (55·5%). Melæna, indigestion and epigastric pain also occurred. Jones quotes Cressman as stating that the benign tumours of the stomach may present as severe hæmorrhage, slow hæmorrhage leading to anæmia, or very occasionally obstructive symptoms. Tanner gives the commonest symptoms as hæmatemesis, melæna, chronic anæmia, or, in the case of pedunculated tumours, colic and vomiting. He also points out that they may be entirely silent. Ker reported a case of leiomyoma in which the symptoms were colic and vomiting on retiring at night.

Diagnosis.

Marshall and Cherry stated that the symptomatology gave no help in diagnosis in their cases. X-ray studies led to a correct pre-operative diagnosis in 12 of 18 cases of leiomyoma. These authors state that the most characteristic X-ray appearance is a globular circumscribed defect in the lumen of the stomach, which may be movable.

Tanner mentions the use of the gastroscope. He draws attention to the "bridging folds" sign present in the connective tissue tumours—rugæ passing from the healthy stomach to the tumour, indicating its submucosal position.

Blood examination will draw attention to iron loss anæmia in cases of anæmia due to slow, prolonged bleeding, and tests for occult blood will prove its gastro-intestinal origin.

If the tumour is large enough, it may be palpable.

Differential Diagnosis.

The chief condition entering into the differential diagnosis is gastric carcinoma. Occasionally a bezoar may also enter the picture.

Prognosis.

As far as the benign tumours are concerned, the prognosis is excellent. The epithelial group of tumours apparently has a high incidence of malignant change—Tanner quotes Pearl and Brunn (1943) as finding malignant changes in 19 out of 37 cases of apparently benign polyposis (50%).

The connective tissue tumours show malignant change less frequently, and all the authors appear to emphasize that the prognosis in malignant connective tissue tumours of the stomach is relatively good. Thus Marshall and Cherry quote two deaths out of a series of 16 cases of "malignant leiomyoma". Twelve of these patients have survived over five years—one for a period of sixteen years.

Metastases are apparently slow to develop; Horley reports them as being present in less than 20% of reported cases.

Treatment.

The treatment of these tumours is by relatively wide local excision. The operation carries a low mortality, and convalescence is usually uneventful. No evidence of any tendency to recurrence of the benign tumours was reported by the authors whose reports were studied.

Reports of Cases.

Of the two cases reported now, the diagnosis was made before operation in one; in the second, the diagnosis was established at laparotomy for continued hæmatemesis. In both of these cases the presenting sign was hæmorrhage—in one slow and long-continued, and in the other sudden and severe.

CASE I.—The patient was a woman, aged twenty-seven years. Her history apparently began in September, 1954. She complained at that time of tiredness and palpitations. She was treated in a country town with "a mixture" and, to use her own words, "seemed to get right". In May, 1955, the symptoms returned. She was admitted to hospital in the same country town, and was found to be suffering from severe anæmia. She was treated with iron by mouth and vitamin B_{12}, without effect, so she was referred for diagnosis and treatment.

On examination, the patient was found to be a well-nourished female, very pale, who was panting from the exertion of walking from the waiting room to the consulting room. Her blood pressure was 170 millimetres of mercury, systolic, and 80 millimetres, diastolic. There was a systolic bruit at all areas, thought to be hæmic in origin. The liver and spleen were not palpable, and there was pitting œdema of the ankles and shins, extending half way up the leg. She was admitted to hospital for investigation, with a diagnosis of "anæmia, ? cause". The blood picture was as follows: The blood urea content was 25 milligrammes per 100 millilitres, the mean corpuscular volume was 60 cubic μ (normal 82 to 92), the mean corpuscular hæmoglobin was 14 microgrammes (normal 27 to 31), and the mean corpuscular hæmoglobin concentration was 23% (normal 32% to 36%). The patient's blood group was O, Rh-positive, and the direct Coombs test produced a negative result. The hæmoglobin value was 2·8 grammes *per centum* (20%); the erythrocytes numbered 2,000,000 per cubic millimetre, and the leucocytes numbered 4800 per cubic millimetre, 69% being neutrophile cells, 29% lymphocytes, 1% monocytes and 1% eosinophile cells. The hæmatocrit reading was 12%. Investigation of the erythrocytes revealed moderate hypochromia with microcytosis. No macrocytes were seen, and the platelets were normal. This was taken to indicate an iron deficiency anæmia, so she was given a transfusion of four pints of blood. After this, she was given "Fergon", two drachms three times a day. As the patient had no menorrhagia (in fact, amenorrhœa had recently developed after oligomenorrhœa for the last few months) and there was no evidence of piles, specimens of fæces were sent for examination for occult blood. These were reported on as "strongly positive for occult blood". She was then sent for a barium meal X-ray examination. This was reported on as follows:

> The heart, lungs and œsophagus are normal. On the greater curvature of the stomach at the junction of the middle and lower thirds, there is a large round defect in filling, about 5 centimetres in diameter. This tumour appears to be mobile within the stomach and has a well defined regular outline. The duodenal cap is not defined.
>
> Findings:—
>
> There is a tumour of the greater curvature of the stomach. This could be a simple tumour, but laparotomy is necessary to confirm this.

On receipt of this report, operation was advised and accepted. At this time, more attention was focused on multiple tumours of the skin of the patient, which had been noticed before but passed over. The patient stated that her mother and sister had the same tumours on their skin. They were considered to be neurofibromata, so before operation the tumour of the stomach was diagnosed with some confidence as a neurofibroma.

Laparotomy was performed on July 6, 1955. An upper left paramedian incision was made, and the abdominal organs were palpated. A mass could be felt in the stomach, but all other viscera appeared normal. The stomach was delivered and the tumour was found to be on the posterior wall. The

lesser sac was opened and the stomach was rotated upwards. There was a projection of tumour into the lesser sac measuring 2·5 by 2·5 centimetres. The intragastric portion was attached to the posterior wall of the stomach 2·5 centimetres from the gastro-epiploic vessels. There was no infiltration of the wall around the pedicle, and the tumour was not attached except by its pedicle. An ellipse of healthy stomach with the tumour pedicle in the centre was removed. The defect in the stomach was closed in two layers and reinforced with omentum. The gastro-colic omentum was reconstituted and the abdomen was closed in layers.

Post-operative progress was uneventful. Gastric aspiration was carried out hourly through an indwelling Ryle's tube, and fluids were allowed by mouth from the start. Fluid and electrolyte balance was maintained intravenously. After forty-eight hours, the fluid and electrolyte balance was satisfactory, and the Ryle's tube and drip tube were removed. The patient was allowed out of bed on the fourth day; sutures were removed on the tenth day, and the patient was discharged from hospital on the twelfth day.

Macroscopic examination of the specimen showed it to be a smooth, firm tumour measuring approximately 7·5 by 5·0 by 2·5 centimetres in volume. The intragastric surface was covered by normal mucous membrane, which was ulcerated in one area. The projection into the lesser sac was covered with normal serosa. The tumour was microscopically examined at (i) the Commonwealth Health Laboratory, Rockhampton, and (ii) the School of Public Health and Tropical Medicine, Sydney; the respective reports were as follows: (i) "Tumour appears benign, resembling a neurofibroma." (ii) "I am of the opinion that it is a neurilemmoma. There appears to be a diversity of opinion as to whether tumours of the stomach with this histology are neurilemmomas or leiomyomas and the question is not easily settled." The patient was examined three weeks after operation. She was well, and her hæmoglobin value was 13·8 grammes *per centum*.

CASE II.—The patient was a man, aged sixty-three years. The history of this patient goes back at least to 1948. His presenting complaint then was "hunger pains" in the epigastrium, which subsided on treatment with antacids and dietary restrictions. Early in 1949 his hæmoglobin value was 66%, and for this he was given iron tablets. In 1952 he had a hæmatemsis. His hæmoglobin value was 47%, and a blood transfusion was carried out. Soon after this a barium meal X-ray examination was carried out. The report was as follows:

> The heart, lungs and œsophagus are normal. There appears to be a filling defect high up in the stomach. This is a most difficult area to examine, as it is beyond palpation.

The patient was referred to Brisbane for examination, but no definite abnormality was found. In 1954 he had another hæmatemesis. Once again he was referred to Brisbane, where an X-ray barium meal examination was reported on as revealing a small prepyloric ulcer. After treatment another barium meal X-ray examination revealed no abnormality.

The patient was admitted to hospital on July 7, 1955, with hæmatemesis and melæna. The hæmatemesis ceased on his admission and treatment. On July 10 he collapsed, with obvious severe concealed hæmorrhage; his blood pressure was 70 millimetres of mercury, systolic, and the diastolic pressure could not be estimated. A transfusion was begun immediately. Over the next twenty-four hours his condition did not improve much, and despite continued blood transfusion his systolic pressure did not rise above 100 millimetres of mercury. It was obvious that bleeding was still continuing, so laparotomy was undertaken on July 12. The abdomen was opened through a transverse incision. Palpation of the stomach revealed a firm tumour attached by a pedicle to the interior wall of the stomach 2·5 centimetres from the greater curvature in the upper third. There was an extragastric projection into the peritoneal cavity. There was no infiltration or fixity to the stomach, so an ellipse of healthy stomach with the pedicle in its centre was excised. The defect was closed in two layers and the abdomen was closed. The post-operative course was uneventful, and the patient was discharged from hospital on the eighteenth post-operative day.

Macroscopic examination showed the specimen to be a smooth, rounded tumour 7·5 by 5·0 by 2·5 centimetres in volume, covered on its intragastric part by apparently normal gastric mucosa, which was ulcerated in three places. In one of these ulcers could be seen a structure which looked like the open mouth of an eroded vessel. The tumour was examined microscopically (i) at the Commonwealth Health Laboratory, Rockhampton, and (ii) at the School of Public Health and Tropical Medicine, Sydney. The respective reports were as follows: (i) "Section of tumour shows the structure of a leiomyoma." (ii) "This is one of those tumours of the stomach which appears to be either a neurilemmoma or a leiomyoma, and I do not know which. I incline to the opinion that it is a leiomyoma, but I cannot exclude the former."

The patient has been examined several times since operation, and appears to be in good health.

Discussion.

As was stated previously, both of these tumours presented with hæmorrhage. In neither instance did the symptomatology give any help in diagnosis; the same observation was made by Marshall and Cherry in their series. In Case I, X-ray examination with a barium meal revealed the globular movable filling defect mentioned by these authors as characteristic of benign tumour, enabling a pre-operative diagnosis to be made. The presenting symptoms in Case II—indigestion, hæmatemesis and melæna—are mentioned by various authors as ways in which these tumours may present. The filling defect on X-ray examination was seen in this instance, but the radiologist could not be sure because of its high position. The reported demonstration of a prepyloric ulcer and its disappearance after medical treatment further complicated the picture. Indeed, the symptoms were those of ulcer, and ulceration was present in the tumour. This gives some idea of the difficulty which may be encountered in the diagnosis of benign gastric tumour.

Summary.

A brief review of the literature of benign gastric tumours is given.

Two case reports are presented.

The difficulties of diagnosis are briefly discussed.

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CERVICAL NERVE ROOT COMPRESSION AND "THE SHOULDER-HAND SYNDROME".

By DOUGLAS MILLER, F.R.C.S., AND K. F. BLEASEL, F.R.C.S.,
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THE association of a stiff and painful shoulder with brachialgia has been recognized and noted for a number of years. It was referred to by Buckley (1904), and by Kahlmeter (1933), who considered that the pain in the arm was secondary to shoulder inflammation which had spread to involve nerve trunks, or alternatively, if the brachial neuralgia was the primary symptom, the shoulder disability was due to prolonged immobilization.

Hanflig (1936) reported five cases of pain in the shoulder and arm, and stated that all cases had at some time been diagnosed as "subdeltoid bursitis", though the reasons for this diagnosis are not clear. These patients all showed radiological evidence of cervical osteoarthritis and responded to treatment by neck traction.

Frykholm (1951) and Miller (1952) have referred to the relationship between brachialgia and the shoulder disability.

It is commonly supposed that in cases of this type the stiff shoulder is the cause of pain, and treatment is directed toward the shoulder, though there may be no evidence of disease or any good theory as to ætiology.

The clinical picture involving a wider spread of brachial pain as far as the hand, associated with a stiff and painful shoulder, and sometimes with stiff and swollen finger joints, has come to be known as the "shoulder-hand" syndrome, and has become further complicated by being recognized as an occasional sequel to coronary occlusion.

During recent years cervical disc lesions and degenerative spondylosis have come to be recognized as a frequent cause of brachial neuralgia which is typically characterized by pain or paræsthesiæ of dermatomic distribution.

This type of brachial neuralgia is usually recognizable on its symptomological basis and may be confirmed by typical X-ray findings in the cervical vertebræ. The malady responds to treatment either by neck immobilization or traction, or sometimes necessarily by decompression of the nerve roots.

It is often obvious that a stiff, painful or even "frozen" shoulder is associated with peripheral brachialgia of typical cervical root origin. Sometimes the stiff, painful shoulder is the first symptom and may dominate the fully developed picture.

The interpretation of such a state must be either the admission of two coincidental abnormalities having no mutual relationship, or the acceptance of the two disorders as having a single cause. The dual picture is too common for coincidence, and experience in the care of these patients strongly indicates that there is a common ætiology.

When neck traction is applied to relieve the brachial pain, one of its first effects is usually ease of shoulder pain and a loosening of joint movement. This is frequently the first observation made by the patient. The following reports are examples of many such cases.

CASE I.—A female patient, aged fifty-nine years, complained of pain in both arms of five months' duration. The pain affected the outer side of her arms as far as the fingers, and was associated with numbness along the outer aspect of both arms as far as the elbow. The limitation of shoulder movements recorded before the commencement of treatment was as follows: right side: abduction 15° with scapula, flexion 90°, extension 10°; left side: abduction 15° with scapula, flexion 90°, extension 10°. Cervical traction was applied, and fourteen days later the following range of movement was recorded: right side: abduction 80°, flexion 90°, extension 15°; left side: abduction 75°, flexion 90°, extension 10°.

CASE II.—A middle-aged woman gave the history that a year previously she had suffered from a stiff and painful neck. This was followed two months later by pain and stiffness in the left shoulder. Her condition had been diagnosed as "tendonitis", and she had been treated by manipulation without any relief. The pain later extended down the arm, and later still into the thumb and the index finger. During the last few weeks the hand had become painful and swollen. Coughing and straining made the pain worse, and she could find no attitude which would bring relief. She was exhausted from pain and loss of sleep.

On examination of the patient, the right hand was seen to be very swollen and stiff in all joints. Attempts at movement were painful. The shoulder joint was very restricted in all movements, and manipulation was very painful. X-ray films of the cervical part of the spine revealed considerable narrowing of the disc between the fifth and sixth vertebræ and associated spondylosis. "Novocain" block of the upper thoracic sympathetic trunk was performed, and the hand quickly improved in colour and the swelling subsided. This change was sustained, and the patient was able to move her fingers. Light traction was then applied to the neck, and the improvement continued. The pain in the shoulder subsided, and movement gradually became possible. Some months later she reported that her hand movements were normal and that her shoulder movement was greatly increased and painless.

It would appear to be a logical conclusion that the restriction of shoulder-joint movement is primarily muscular in origin, and not, as is so often assumed, the result of periarticular adhesions. Only thus can we explain increase of movement after neck traction. If the immobility of the shoulder has existed for a long time, the early relief obtained by neck traction may not be complete, and physiotherapeutic aid may be required to increase the range of movement. However, primary manipulative treatment of the shoulder joint is usually illogical.

The basis of this muscle spasm and rigidity would appear to be neurogenic. It is probably a sound analogy to compare it to abdominal muscular rigidity secondary to peritoneal or intestinal irritation.

It is interesting and helpful to note that Downman's experimental work on the spinal cord shows how splanchnic or intercostal stimulation causes direct excitation of the spinal cord with discharge impulses along the intercostal nerves at higher and lower levels. This spread of impulse may be extraspinal, along the sympathetic trunk, or intraspinal. The spread of the impulse is in proportion to the strength of the stimulus.

The stiff shoulder and, to carry the argument further, the stiff peripheral joints seen in brachial neuralgia are almost certainly the expression of similar neuro-muscular discharges due to strong stimulation of the nerve roots.

The recognition of a similar symptom-complex after coronary occlusion is probably dependent on a similar mechanism. Osler (1897) observed a stiffness of the shoulder in some patients after anginal attacks. Libman (1935) noted the frequent coexistence of shoulder pain and *angina pectoris*.

Ernstine and Kinell (1940) reported 17 cases of persistent shoulder pain in 133 cases of myocardial infarction. In six of these cases "rheumatoid arthritis" involving the hand joints developed simultaneously with the shoulder disability.

Hiller (1949) reported 11 cases in which a shoulder-hand syndrome followed severe coronary insufficiency or myocardial infarction. In this series no patient developed the shoulder-hand syndrome unless myocardial failure and prolonged hypotension were present. Patients who regained good myocardial function tended to recover from their shoulder-hand disability, but continued myocardial insufficiency tended towards its aggravation. This author postulates an "internuncial pool" in the spinal cord where the afferent cardiac impulses may stimulate the anterior horn cells causing muscle spasm of the shoulder, or an abnormal sympathetic efferent outflow to the upper limb. This would be in keeping with the observations of Downman.

Though it seems probable that this symptom-complex may be the direct neurogenic effect of an intense and prolonged visceral stimulus, there may sometimes be another explanation.

It is possible that during the long and sustained throes of pain and disability following coronary occlusion the neck has assumed a faulty attitude and has brought about a true cervical root brachialgia in no way different from that occurring without coronary disease. If this was so, neck traction would be likely to overcome the clinical disability. The following cases illustrative of this may be quoted.

CASE III.—A vigorous man, aged seventy-three years, had suffered a heart attack six months previously. Shortly after this he complained of pain in the left shoulder, extending down the ulnar borders of his forearms and hands. Both hands had become swollen and hypersensitive, and he was troubled by a continuous burning in the medial three fingers. All movements of the left shoulder joint were absolutely restricted, and manipulation was very painful. Tenderness to palpation was present in the left supraclavicular fossa. Both hands were swollen and stiff, and the

inner three fingers were red, congested and hyperæsthetic. X-ray films showed pronounced degenerative spondylitic changes in the lower cervical joints. There were no definite changes in the shoulder joint.

He was treated by cervical traction with 12 pounds' weight applied to a sling. Within twenty-four hours his shoulder joint had regained considerable painless movement, and within a few days the pain, swelling and tenderness had disappeared from his hands. After a week of treatment his hands were normal and he was free from pain. A few sessions of exercises restored his shoulder joint to full movement.

CASE IV.—A man, aged fifty-five years, had complained of attacks of *angina pectoris* for three months after a coronary occlusion. He had spent six weeks in bed and after this suffered from a painful shoulder. The pain was shooting or burning in character in the front of the elbow and outer aspect of the left arm. It awakened him in the mornings with a numb feeling and tingling in the left hand.

On examination of the patient, rotation and lateral flexion of the neck produced discomfort at the base of the neck. His shoulder movements were as follows: abduction, 45°; forward flexion and backward movement, 45°. There were slight wasting of the left forearm and flattening of the hypothenar eminence. Power, sensation and reflexes were normal. X-ray examination of the cervical part of the spine revealed degenerative changes of the middle apophyseal joints and between the lower three cervical discs.

Sympathetic block of the upper thoracic chain was performed without relief of pain or improvement in movement. Cervical traction with 12 pounds' weight was continued for seven days. There was relief from pain, and 80° of movement was restored to the shoulder. Two days later he had full and free movement at the shoulder. Anginal attacks continued.

It has to be remembered that these patients generally do not come the way of the neurosurgeon or orthopædic surgeon, and this interpretation of their clinical state may not be appreciated.

Conclusions.

The stiff and painful shoulder associated with cervical nerve root compression is considered to be the direct neurogenic effect of the nerve root irritation. It is probably the expression of a spinal reflex resulting in muscle rigidity. The same cause probably underlies the stiff and painful peripheral joints seen in this condition.

The stiff shoulder and other joints frequently respond promptly to appropriate treatment directed to the neck.

The upper limb arthropathies associated with coronary occlusion are discussed. There are considered to be neurogenic, and the direct result either of strong sympathetic stimulation with somatic discharges, or alternatively of a true nerve root compression due to disk degeneration.

The term "shoulder-hand syndrome" is not illuminating and may be misleading. It would be better to regard the condition as merely an aspect of cervical nerve root irritation.

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THE CARE OF THE UNBORN.[1]

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THE last two decades have seen a great increase in the interest taken in the newborn infant. It is realized that this little individual, who has lived only a few short hours or days outside the mother, has spent many long months locked in intrauterine secrecy. All the pathological conditions in the stillborn and the great majority of those in the newborn are caused by factors operating during pregnancy or parturition. It follows, therefore, that if we are to understand and prevent the causes of stillbirth and neonatal mortality and morbidity, we must study the various forces at work in the pre-natal period. To care for the newborn, we must care for the unborn.

Every individual is the result of the interaction of the environment and the genetic constitution. The genetic constitution is beyond our control, but the environment can be influenced.

If we are to ensure optimal health of the fœtus, it is necessary that the environment of the fertilized ovum shall be normal. This environment consists of the extracellular fluid and the blood and tissues of the mother. It follows, therefore, that the pre-conceptional health of the mother is of fundamental importance. Pregnancy, like parturition, is a function of the whole woman, and any deviation from normality in the general health creates a hazard to the developing embryo, as does also local disease of the reproductive organs. The health of the mother, both somatic and psychological, should be as good as possible before conception occurs, as well as after.

ADVERSE INFLUENCES.

Factors which may influence the environment adversely both before and during pregnancy may be classified as five in number and approximately in the following order of frequency: (*a*) nutritional factors, (*b*) oxygen lack, (*c*) infective factors, (*d*) metabolic factors, (*e*) irradiation.

Of these five factors, two, the nutritional and the metabolic, may operate throughout the whole of pregnancy and parturition, while the others, oxygen lack, metabolic errors and irradiation, generally have an episodic incidence.

Nutritional Factors.

Nutritional deficiencies are frequently encountered. They produce very diverse effects, depending on the type and degree of the deficiency. Other associated incidental factors, such as the occurrence of sporadic vomiting, diarrhœa or infection, by exacerbating an underlying chronic deficiency, may produce an effect at one particular time.

[1] Based on the presidential address delivered to the Section of Pædiatrics, Australasian Medical Congress (British Medical Association), Ninth Session, Sydney, August 20 to 27, 1955.

The cause of a poor nutritional state may be a deficient diet. Even when a good diet is taken, severe vomiting, prolonged diarrhœa or malabsorption may produce deficiency states.

The mother who is in a poor nutritional state before conception may have her deficiency made overt by the nausea and vomiting and poor food intake common to the early months of pregnancy. If she is in a good state of nutrition prior to pregnancy, even severe vomiting will not produce significant deficiency in the important early weeks.

The experimental work of Warkanay undoubtedly has its parallel in the human. He produced a high incidence of congenital defects in the offspring of mother rats who were rendered nutritionally deficient before and during pregnancy.

When one works in a follow-up clinic for newborn infants who have shown pathological conditions or defects, or who are premature, one is struck by the high incidence of evidence of nutritional deficiencies in the mothers of these babies.

One can form a rough estimate of this by the general appearance, along with the condition of the tongue and the finger nails. The history of the pregestational and pregnancy diet is very frequently that of inadequacy, particularly in the vitamin *B* group and protein, frequently associated with excessive intake of refined carbohydrate. At times there is a history of a tendency to diarrhœa with a bowel habit of the frequent passage of loose, large stools, indicating a malabsorption state.

I should like here to make a plea for discrimination in weight control during pregnancy. Many women who suffer from severe vomiting lose much weight. When the vomiting ceases they gain weight rapidly, as indeed they should do. All too frequently this normal gain is regarded as pathological, and the unfortunate mother has her diet reduced so that she remains underweight and malnourished. Also, if the fat content of the diet is greatly reduced, it is necessary to ensure that the mother gets her fat-soluble vitamins in some vitamin-concentrate form.

Oxygen Lack.

Oxygen lack may be the result of local or general causes during pregnancy. Local causes include the uterine contraction of threatened abortion. General causes include any condition producing maternal hypoxæmia, such as asthma, chronic pulmonary or cardiac disease, anæmia, blood loss, prolonged convulsions, syncope or shock. Hypertension and pregnancy toxæmia are known to produce deficient placental function and may produce deficient oxygenation of the fœtus. Blood incompatibilities between mother and fœtus, by causing fœtal blood destruction, may also produce fœtal hypoxæmia.

At birth abnormal uterine action and all the well-known causes of intrauterine anoxæmia may occur.

Infection.

Several diseases are now believed to pass over the placenta—for example, rubella, syphilis, homologous serum hepatitis, toxoplasmosis, *herpes simplex*, *herpes zoster*, tuberculosis, chickenpox, smallpox, measles, scarlet fever and typhoid fever. It is probable that as more work is done other diseases will be added to this list.

Metabolic Factors.

It is known that the fœtus of a diabetic or pre-diabetic mother may be a "giant fœtus" with splanchnomegaly and an increased risk of congenital abnormality. Clinically one gains the impression that the offspring of the mother with an abnormal thyroid also has an increased risk of congenital defects. It is possible that other maternal endocrinopathies may also act to the detriment of the fœtus.

Injections of cortisone during pregnancy in experimental animals can produce congenital defect.

Irradiation.

The ill effects of X-ray and other radiations are established but infrequent causes of abnormalities.

Comment.

In general the type and severity of the adverse influence are significant, but the most important aspect is the time of the insult. The same factor produces different effects when exercised at different times. An influence acting in the early weeks may cause death or defect in the embryo, but operating at a later date it may be without effect.

From the point of view of this timing, pre-natal life may be divided into the following three stages: (*a*) The first stage—the first three months. This may be regarded as the stage of development when the organs are differentiated. (*b*) The second stage—from three months to term, the stage of growth of the fœtus. (*c*) The third stage—that of birth.

The First Stage.

During the first stage, rapid differentiation and growth of the organs take place. The tissues are then extremely vulnerable, so that a slight insult may have a severe effect. Adverse influences at this period may produce arrest of development, maldevelopment or death. There is an orderly sequence during this time of organogenesis, so that there is a time when each particular organ is at its height of development. Then it has the highest priority for oxygen in the body of the embryo and will therefore be the organ affected if the factor operates at that time. We are often able to pin-point the time when the insult occurred by noting the type of defect. Nutritional factors are of importance at this period. The clinician cannot fail to be impressed by the cases which he sees of definite nutritional deficiency in the mother associated with congenital defects in one or more offspring.

Nutritional deficiencies in the pre-conceptional period may cause trouble in this first stage. It is too late to improve the mother's state after conception, as the most important phase of organogenesis is usually past by the time she knows she is pregnant. To coin a slogan: "It is not what she eats when she is Missis, but what she eats when she is Miss" that matters.

If a mother has a history of repeated hyperemesis in successive pregnancies, it is usual to find that the first infant is normal, but the offspring of the second pregnancy may suffer congenital defect. The mother has been rendered deficient by the first pregnancy, and conceives the second child while she is in this state. Thus the deficiency is present during the organogenetic period of the second child, while it occurred later than this period with the first child.

> For example, a child was examined who had congenital cardiac defect and hemivertebræ. She was the second child in the family. The mother had vomited severely throughout her first pregnancy, and was delivered of a normal child. She breast fed this baby, but never felt well. She vomited severely also through the second pregnancy, and gave birth to the baby with the congenital defects. She was then treated for her nutritional deficiency, and conceived a third time. During this pregnancy the vomiting was controlled, and she gave birth to a normal infant.

Women with nutritional deficiencies often have a history of previous miscarriages, and it is reasonable to assume that these also have been due to nutritional deficiency. Such fœtuses are frequently malformed.

By correcting the mother's deficiencies before conception, we can do constructive work towards ensuring better fœtuses in subsequent pregnancies.

Conditions producing oxygen lack are a common occurrence at this period, as has been indicated previously. If oxygen lack is severe, death of the fœtus will result. If it is less severe, congenital defect may be produced.

Most observers note a higher incidence of congenital defect in ex-nuptial children. It is usually thought that abortifacients which may have been used are a possible ætiological factor.

Of the infections occurring in the first stage, rubella is, of course, the most widely known. Clinically it would appear that investigation may show other diseases to be

just as dangerous. Exhibition of antibiotics for maternal infections at this period may produce hypovitaminosis, and this may be a factor injurious to the fœtus. The malformations associated with endocrine disturbances occur at this stage.

The Second Stage.

The second stage, from the third month till term, is the period of growth, when the placenta has been formed. The health of the fœtus during this stage is dominated by the health of the placenta. This remarkable organ is for all practical purposes an entirely fœtal organ which is situated on a pedicle (the cord) outside the body of the fœtus. All the mother supplies is the blood-lake in which the placenta is imbedded. The fœtal blood circulates through the placenta as it does through all the other fœtal organs, and remains quite separate from the mother's blood-lake. The placenta serves respiratory, nutritional, excretory and hormonal functions. The fœtus depends on it for its life, and in turn the placenta depends for its life on the fœtus. The function of the placenta may be impaired either by defect within itself or by deficiency of the blood in the maternal blood-lake in either quantity or quality.

Anything which impairs the function of the placenta will impair the health of the fœtus. This will still further impair the health of the placenta, and so a vicious circle is set up. In Biblical phraseology: "To him that hath shall be given and from him that hath not shall be taken away even that which he hath."

Placental insufficiency is a very real condition frequently encountered, and produces varying grades of fœtal injury. It causes oligohydramnios (oligoamnios) with hypoxæmia, dehydration and malnutrition of the fœtus, the extent depending on the degree of the functional impairment of the placenta. In severe cases intrauterine death will occur, or the ill-nourished, hypoxæmic fœtus may die during a normal, easy labour.

When born alive, the fœtus at term may weigh only three pounds and a few ounces, and may be much shorter than the normal infant. In less severe cases the infant may be of normal length, but thin, with a long, thin neck. As a result of the ingravescent hypoxæmia, the fœtus passes meconium which mixes with the scanty liquor, staining the skin and nails a dirty greenish-brown. There is no vernix, and the skin peels, often in large flakes, so that the denuded pink tips of the fingers and toes appear to be protruding from old gloves. There is an absence of subcutaneous fat, and the tissues are dehydrated. These babies are late in passing urine and tend to vomit mucus for several days. They are also prone to hæmorrhagic disease of the newborn, since the prothrombin level in the blood has been depressed as a result of the intrauterine hypoxæmia. They are also prone to earlier and more severe jaundice than the normal infants.

In these cases of placental insufficiency occurring in the second and third trimesters, the degenerative changes which should take place at term have occurred too early; that is, the placenta has become prematurely senile.

The usual history of severe repeated placental insufficiency is one of repeated intrauterine death of the fœtus. If the pregnancy is terminated just prior to the intrauterine death of the fœtus and the placenta is examined, it is found to present a typical appearance. The maternal side, instead of showing the usual dark-red cauliflower-like appearance, resembles smooth steak. It has a glazed appearance due to the deposition of a layer of fibrin. The placenta is usually small, often rather fibrous and at times infarcted. The liquor is usually very scanty, frequently thick, green and slimy, and at times seems to be absent.

In some cases of premature placental senility the cause is known. There is no doubt that one cause is nutritional deficiency, and correction of this may enable the mother to carry the fœtus to a viable period. In others toxæmia of pregnancy may be causative by impairing the placental exchange from the maternal blood-lake to the villi. Careful treatment of the mother at rest in bed is necessary. If in spite of good treatment the toxæmia is worsening and the fœtus is viable, it is advisable in the interests of the fœtus to terminate the pregnancy.

The narrowed arteries of the hypertensive mother cause a deficient supply of blood to the maternal blood-lake. This produces a small placenta with a small fœtus. These placentæ have impaired function and may degenerate early, with consequent intrauterine death of the fœtus. As long as the fœtus appears to be growing, it is usually safe to carry along the patient at rest in bed. Cessation of growth of the fundus is usually an indication of either oligohydramnios or cessation of fœtal growth, and is a warning of the danger of the intrauterine death of the fœtus. Provided the fœtus is viable, it is advisable in the interest of the baby to terminate the pregnancy at this point.

In some cases endocrine disturbances (for example, the pre-diabetic state) appear to be the cause of the placental inadequacy, but in many the cause remains obscure.

The position of the placenta in the uterus may put it at risk as in *placenta prævia*. The usual treatment of this condition now is to carry along the pregnancy with the mother at rest in bed as long as it is considered safe, in order to allow the fœtus to become viable. This requires very nice judgement. If the mother has a very severe hæmorrhage, the fœtus may be injured from the anæmia consequent on her diminished blood volume, with impaired placental circulation. The fœtus may also actually bleed itself if the villi are torn, and it then may become exsanguinated.

Partial separation of the placenta from the maternal blood-lake, as occurs in retroplacental hæmorrhage, of course, causes a great risk to the fœtus, the site of the hæmorrhage as well as the extent being significant. If the hæmorrhage occurs beneath the insertion of the cord, a small hæmorrhage may have a much more severe effect than a large hæmorrhage situated laterally.

Other factors than the placental may injure the fœtus, of which one is blood group incompatibility, such as Rh factor or A B O group incompatibility.

The blood group and the Rh factor of every pregnant woman should be known, as also the details of previous confinements and pregnancies. The intrauterine death of the fœtus from fœtal hydrops in erythroblastotic fœtuses has hitherto been considered a non-preventible calamity. The premature erythroblastotic fœtus was considered to be a likely candidate for kernicterus, and the pregnancy was allowed to continue. Now, however, that it is becoming a common practice to perform exchange transfusions on infants to prevent premature kernicterus, we can induce labour prematurely when the indication occurs. Such infants will require exchange transfusion at birth for the blood incompatibility and may need further exchange later if the jaundice of prematurity becomes severe.

Any factor which exacerbates oxygen lack to the fœtus, such as hypertension, toxæmia, nutritional deficiency, infection, anæmia or any other adverse factor, may precipitate the erythroblastotic fœtus into a state of fœtal hydrops. If we can by our management prevent the occurrence of these adverse conditions, the mother may carry the fœtus to term. If, however, fœtal hydrops is threatening, we can by careful observation of the uterus and a careful watch for hydramnios at times forestall its advent. By terminating the pregnancy at a viable period we may ensure a live infant, which can then be treated. Such interference calls for very careful and experienced judgement. One sees infants delivered prematurely because of a rising antibody titre who have died of atelectasis of prematurity. It is well to remember also that a rising antibody titre can occur with an Rh-negative fœtus.

Maternal infection during these two trimesters may cause death or morbidity of the fœtus. If careful notes are taken, it may be found that during an infection definite symptoms are noticed relevant to the size of the uterus and fœtal movement. There can be little doubt that the fœtus is ill in the uterus as a result of the mother's illness. At other times maternal illness may be associated with acute hydramnios.

Certain viral infections of the mother in the weeks before confinement may cause infection in the fœtus which may continue at and after birth. When looked for, these cases

are not uncommon. In this condition the fœtus may stand the stress of birth badly, so that it may die during labour or may be born ill. These babies are usually incorrectly regarded as suffering from asphyxia from obstetric causes.

I have seen indubitable acute myocarditis in an infant who died on the second day, and who at birth was regarded as suffering from asphyxia. Post-mortem examination revealed a typical histological picture of acute myocarditis. The mother had suffered from a respiratory infection for three weeks before and up to the time of confinement.

In another case an infant became ill on the eleventh day with fever, coryza and vomiting. This was later followed by diarrhœa and severe dehydration, with head retraction, pallor, great increase in cerebro-spinal fluid and meningismus. On the eleventh day the mother also became febrile with an upper respiratory tract infection, and on the fourteenth day developed *herpes frontalis*. On the twelfth day the father complained of severe pain in the right side of his chest, and the next day developed *herpes zoster* at this site. Both the parents had been in contact with an adult suffering from chickenpox four days before the birth of the baby.

The duration of the second stage of pre-natal life may be pathologically altered. It may be unduly shortened, with the production of a premature infant, or unduly prolonged, so that a post-mature infant results.

Prematurity is everywhere the greatest cause of neonatal loss, and any measures which decrease its incidence will save many infant lives. It is therefore important to ascertain whenever possible the cause of the prematurity, so that any preventible condition may be removed. It is generally estimated that the prematurity occurs in about 6% of all births, and that in about 60% of the cases there is no obvious obstetric cause.

In depressed areas with poor diet and poor living conditions the incidence of prematurity is higher than the average, and may be two or four times the accepted figure. The clinical research of Tompkin and Wiehl indicates that the mother who begins pregnancy underweight and with a low hæmoglobin value has a greatly increased risk of premature labour.

It would appear that here again nutritional factors operate, and the higher incidence of malformation in premature than in full-time infants is also suggestive of this association.

Endocrine disturbances appear to be the cause in some cases.

The treatment of the premature infant is important and constructive, but the prevention of prematurity is much more important.

It is of interest that when toxæmia is minimized as far as possible, the pregnancy can usually be carried on further than in the poorly treated patient, so that a fœtus of greater gestational age with therefore a better prognosis is born.

Two recent obstetric procedures are of interest in preventing premature birth—namely, the practice of bed-rest in the latter weeks of pregnancy for the mother with a multiple pregnancy, and with suitable precaution the suturing of the cervix in patients with an incompetent cervix.

There are, on the other hand, conditions in which premature birth is deliberately induced to produce a live infant—for example, maternal diabetes, and cases in which intrauterine death of the fœtus has occurred, of hypertension or toxæmia.

The fœtus which is carried too long in the uterus suffers two risks. If the placenta begins to degenerate, the fœtus will suffer from a progressive placental insufficiency with its hypoxæmia and may die in the uterus before the onset of labour. As has previously been stated, such fœtuses stand the stress of labour badly and may die during a normal labour. If, on the other hand, the placenta continues to grow, the fœtus suffers from the risk of disproportion, owing to its big size relative to the birth canal. Also labour in the post-mature pregnancy is apt to be prolonged and unsatisfactory, with a tendency to inertia.

The management of cases of post-maturity often causes much anxiety. If the mother continues to lose weight, with an abdomen decreasing in size, movements which become less and less and an increasing hardness of the uterus, it usually betokens oligohydramnios and a wasting fœtus with placental degeneration.

The procedure to be followed, whether conservative or radical, is based on social rather than on medical grounds, the most important being the age and parity of the mother.

The Third Stage.

The third stage, that of birth, is dominated by obstetric factors. The main hazards to the fœtus at this time are those of anoxæmia, trauma and infection. Anoxæmia is the greatest of these risks, and the placental efficiency—the placental reserve which is determined during pregnancy—is frequently the deciding factor between life and death. The fœtus who has some degree of placental insufficiency before birth may be quite unable to withstand the physiological hypoxæmia produced by the normal uterine contractions, and a stillborn infant may result. The infant with a good placenta, on the other hand, can withstand a difficult labour without hypoxæmic injury.

Good ante-natal care will diagnose many cases of disproportion, and the correct treatment can prevent fœtal disaster. Malpresentations will be corrected, or if this is not possible, will be watched and treated. Disordered uterine action, whether it produces inertia or precipitate labour, is a frequent cause of fœtal hypoxæmia. One cannot fail to be impressed with the effect of the mother's psychological state on the uterine action. Precipitate labours are a not infrequent cause of fœtal anoxæmia and intracranial hæmorrhage, and often appear to have a psychological basis. Similarly uterine inertia may also be psychologically determined.

We can inculcate confidence during labour by instructing the mother beforehand so that she knows what will happen to her. The mere presence of an attendant all the time when she is awake also greatly helps her by lessening fear. It is everywhere observed that mothers who have learnt relaxation technique during pregnancy and practised it successfully during parturition have shorter and more efficient labours than the average, and that the incidence of disordered uterine action is reduced in this group. Sedatives, analgesics and anæsthetics may all influence the fœtus, and the dose and timing call for judgement.

Conclusion.

It will be seen, therefore, that in promoting the optimum health of the unborn there are four workers, the physician, the obstetrician, the labour ward sister and the pædiatrician. The physician's aim is to ensure good preconceptional and gestational health for the mother. The obstetrician and pædiatrician work together during pregnancy for the good of the fœtus, often with the collaboration of the physician. Such liaison is essential. The obsterician is aware of the end result of his management and procedures, and the pædiatrician knows the intrauterine history of the continuing fœtus, the newborn baby. This association is necessary, not only for the saving of individual infants, but also for the adoption of those procedures during pregnancy and parturition which best help the parasitic, aquatic fœtus to become the independent, air-breathing infant.

Reviews.

Anæsthesia, Thief of Pain. By Sylvan M. Shane, with introduction by Henry E. Sigerist; 1956. New York: Vantage Press. 5½" × 8", pp. 87, with illustrations. Price: $2.50.

It will soon be posible for all enlightened homes to have a medical library, written especially for laymen, covering the complete scope of medicine. Dr. Sylvan M. Shane has produced the latest arrival on the shelf on the topic of anæsthesia. The author states in the foreword: "This book was written to dispel from your mind the fears usually

associated with anesthesia, thus permitting you to live one of the most fascinating and mysterious experiences of your life."

All types of anæsthesia, whether general or local, spinal or caudal, are discussed, and mention is made, too, of hypnotism. An all too brief chapter gives the history of anæsthesia and traces the major developments that have been made in the past hundred years since ether was first used.

Having an anæsthetic should be "an ethereal experience", states the author, and he tells how this is brought about with the aid of modern premedication. Perusal of this work will help banish the apprehension often associated in the past with anæsthetics and surgical procedures, and will do much to reassure nervous patients.

Preparing for Motherhood: A Manual for Expectant Parents. By Samuel R. Meaker, M.D.; 1956. Chicago: The Year Book Publishers, Incorporated. 8" x 5", pp. 196, with illustrations.

IN the modest Victorian era, the first inkling an incipient father received about his parenthood was the sight of his wife knitting little garments, at least so avers Professor Samuel R. Meaker in his engaging book "Preparing for Motherhood", which is a manual for expectant parents. However, these are not days of reticence and possibly the mother-to-be will quite early see her spouse reading such a book as this, for the opening chapter is directed at the father-to-be, briefing him for his part and telling him what he can do to ease the qualms and fears for the mother both before and after baby's arrival.

All aspects of pregnancy are dealt with, the subjects including a description of the internal fœtal development, the early signs of pregnancy, diet, exercises and a description of the stages of labour. Details of modern anæsthesia that ensures painless childbirth are also given. The author emphasizes the advantages of breast feeding, even though it may mean that the mother is tied down by it, whereas a bottle-baby can be fed by anyone. He wisely states that one of the greatest factors in looking after a baby is to treat it as an individual and not as a machine, remembering that babies "thrive on large doses of a medicine that modern pædiatricians call T.L.C.—or tender loving care".

It would be hard to find a more happily written book on this theme, and the author and the Year Book Publishers are to be commended on it.

Any Hope, Doctor. By Irene Gates, M.D.; 1955. London: Blandford Press. Melbourne: M.R.A. Books. 7½" x 5", pp. 203. Price: 10s. 9d.

MOST people who read this book by Dr. Gates and take it seriously will appreciate it. They may think that the title has not been aptly chosen. The author writes a short account of her own experience in practice and she shows that human nature can be changed if people will accept the guidance of God Almighty in their lives. Her first subject is herself, and she has many illustrations from those who consulted her. She ends by applying her views to the world at large. No one can read this book carefully without deriving benefit from it.

The Year Book of Endocrinology (1955-1956 Year Book Series). Edited by Gilbert S. Gordon, M.D., Ph.D.; 1956. Chicago: The Year Book Publishers, Incorporated. 7½" x 5", pp. 367, with many illustrations. Price: $6.00.

IN this Year Book are abstracted articles on endocrinological subjects that have appeared in journals received between January and December, 1955. The editor in his introduction draws attention to the main developments in endocrinology during the year, and points out that the posterior pituitary hormone, oxytocin, is the first internal secretion of the pituitary to be manufactured artificially. This is due to the achievement of Dr. Vincent du Vigneaud, of Cornell University, who synthesized oxytocin. The work suggests that the synthesis of other pituitary principles, such as corticotrophin, and even of other more complex hormones such as insulin, may become possible.

The scheme of this Year Book is similar to that of its predecessor. The sections are as follows: the pituitary gland; the thyroid gland; the parathyroid glands, calcium metabolism and metabolic bone diseases; the adrenal glands; the reproductive system; carbohydrate metabolism; endocrine treatment of neoplastic diseases. In the section on the adrenal glands there is a special article by E. Perry McCullagh on "Primary Aldosteronism and Adrenal Tumor", and in the section on carbohydrate metabolism L. Arthur Mirsky contributes a special article entitled "Hypoglycemic Action of Sulfonamide Derivatives in Diabetes Mellitus".

With the plentiful editorial comments throughout the text, and the two special articles referred to above, this Year Book is admirably calculated to provide the latest information on endocrinological problems for all those who consult it.

The Year Book of Neurology, Psychiatry and Neurosurgery (1955-1956 Year Book Series). Neurology, edited by Roland P. Mackay, M.D.; Psychiatry, edited by S. Bernard Wortis, M.D.; Neurosurgery, edited by Percival Bailey, M.D., and Oscar Sugar, M.D.; 1956. Chicago: The Year Book Publishers, Incorporated. 7½" x 5½", pp. 576, with illustrations. Price: $7.00.

THIS Year Book has the same editors as before. The articles abstracted appeared in journals received between November, 1954, and October, 1955. In the section on neurology, edited by Roland P. Mackay, there is a new subsection on trauma, and "spino-cerebellar degeneration" and "miscellaneous" have been added under the heading "degenerative diseases". The section on psychiatry, edited by S. Bernard Wortis, has been rearranged. Although the section is shorter than in the previous Year Book, the subsections are more in number. "Psychodynamic studies", "experimental psychiatry", "paroxysmal convulsive disorders" and "miscellaneous clinical syndromes" have been added, while in the subsection on therapy "rhythmic sensory stimulation" is mentioned. As previously, the neurosurgical section has been edited by Percival Bailey and Oscar Sugar. The subsections number three less than before. New ones added are "the hypophysis", "radioactivity" (dealing with the new diagnostic and therapeutic uses of radioactive isotopes), "vascular lesions", "infections" and "hydrocephalus". This Year Book maintains the high standard of the series. It will be found a useful source of up-to-the-minute information on the subjects covered by it.

Midwifery: Principles and Practice for Pupil Midwives, Teacher Midwives and Obstetric Dressers. By R. Christie Brown, M.B., M.S., F.R.C.S., F.R.C.O.G., Barton Gilbert, B.Sc., M.D., F.R.C.S., F.R.C.O.G., Donald B. Fraser, M.A., B.M., B.Ch., F.R.C.S., F.R.C.O.G., and Richard H. Dobbs, M.D., F.R.C.P.; Fourth Edition; 1956. London: Edward Arnold (Publishers), Limited. 7¾" x 4¾", pp. 896, with 223 illustrations. Price: 25s.

THIS book for nurses deals with obstetrics in the conventional manner. To the main sections are added 130 pages on scientific principles and general anatomy and physiology, and 140 pages on the management of the child in the neonatal period.

In the preface to this fourth edition the authors reiterate their aim of "training the midwife to think rather than to rely on her memory of facts and methods of treatment". Yet in the ideal nurses' text-book the balance between theory and practice must be in favour of the latter; the theoretical discussions must be concise and up to date, and the whole presented in a form easily read and rapidly revised, with guidance in distinguishing the essentials.

"Midwifery" fails in these respects. As an example, out of date theories of the ætiology of toxæmia occupy four pages, while a page and a half are allotted to the management of eclampsia. No mention is made of the treatment of some conditions. Though the midwife will not be ordering anticoagulants for thrombotic conditions in the puerperium, some patients under her care will undoubtedly be receiving them, and she should have some idea of their actions and dangers.

While we agree wholeheartedly with the authors' aims as stated, it is doubtful whether they have achieved these aims in this book.

Medical Problems of Old Age. By A. N. Exton-Smith, M.A., M.D. (Cantab.), M.R.C.P., with a foreword by The Rt. Hon. Lord Amulree, M.A., M.D., F.R.C.P.; 1955. Bristol: John Wright and Sons, Limited. 8½" x 5½", pp. 342, with 17 illustrations. Price: 30s.

As stated in the foreword by the Right Honourable Lord Amulree, this is the first text-book produced in England on the subject of diseases of the elderly, or geriatrics. Whilst many parts of the book deal with treatment in hospital, adequate information is also given for the maintenance of health and care of illness in the home by general practitioners.

The introductory chapter states clearly the clinical implications of aging, and this is followed by two chapters on history taking and examination, stressing the main

features of importance in the aged and the differences when compared with the younger patient. There is then a very good chapter, with sound common-sense principles, on the maintenance of physical and mental health in old age. The following four chapters deal with practical problems of home care, rehabilitation and nursing. A further chapter is devoted to surgery and anæsthesia, and dispels many of the fears of these procedures in elderly patients. The final ten chapters deal with the common diseases of old age under the various systems. Each disease is considered separately in much the same manner as in standard text-books, though more briefly.

It can be seen therefore that the scope of the book includes the social and welfare aspects of geriatrics and descriptions of the common diseases with their management. This makes the book very useful to the practitioner, and we consider that it could also be read profitably by the undergraduate. The subject matter contains the results of the author's extensive experience in this field of medicine.

We offer little criticism. Treatment would be better stated more in principle only, and the detail left for the text-books of general medicine and therapeutics. A book such as this is read only by those already familiar with treatment at other ages, and consequently the details of treatment, often personal preference, become boring. We should like to correct the impression gained concerning the treatment of diabetes in old age; the majority do not require insulin, and large doses are rarely required.

The author has succeeded in writing a book on a previously neglected aspect of medicine, which is stimulating, informative and practical. As is quoted at its commencement: "An honest and able Physician may surely approve himself to his ancient patient, 'A restorer of life, A nourisher of old age'."

A Guide to Psychiatric Books: With Some Suggested Reading Lists. By Karl A. Menninger, M.D. The Menninger Clinic—Monograph Series Number 7; 1956. Second Revised Edition; 1956. London and New York: Grune and Stratton. 5½" x 8½", pp. 173. Price: $4.75.

THIS book is designed to be a guide to the rapidly expanding literature of psychiatry and its related subjects for the benefit of psychiatrists and other medical practitioners, students, members of other scientific professions and those who are concerned with the various other related disciplines in the psychiatric field. It consists essentially of a classified list of books with the publishers and publication date. The system of classification is quite detailed without being complicated and should make the finding of any desired book a simple matter. The list is necessarily selective, but its compiler has included a large number of books and has tried to give adequate representation to authors with various points of view. In addition to the main list of books he has included a number of reading lists. These are designed for residents in psychiatric training, for general practitioners and for clergymen counsellors and others interested in the interrelationships of religion and psychiatry. The painstaking care which has gone into the compilation of this book will greatly simplify the task of selection for others.

Radium Therapy: Its Physical Aspects and Extensions with Radioactive Isotopes. By C. W. Wilson, M.Sc., Ph.D., F.Inst.P. Foreword by Sir Stanford Cade, K.B.E., C.B., D.Sc., F.R.C.S., M.R.C.P., F.F.R. Second Edition; 1956. London: Baillière, Tindall and Cox. 9¼" x 6", with 94 illustrations; pp. 295. Price: 37s. 6d.

AFTER eleven years, Dr. C. W. Wilson has wisely decided upon a second edition of his text on the physical principles of γ ray therapy. The first edition will be remembered by all students of radiotherapy as a complete summary of all necessary physical and mathematical principles with a thorough application of these principles in the planning of actual treatments. The second edition, enlarged from 224 to 286 pages, includes additional information where necessary in the earlier sections, as well as new chapters on the recent developments in beam therapy, and the use of radioactive isotopes in treatment.

The first five chapters deal adequately with the necessary physics of radioactive materials and the difficult problem of dosage measurement, and also the interaction of high energy radiation with matter. Then follow four chapters dealing with the physical problems of irradiating volumes of tissue by means of surface, interstitial, and cavitary applicators, and with telecurie therapy units. Individual clinical problems are treated clearly and concisely, and complete references are made to the relevant literature. A final section comprises a discussion on the problems arising in the protection of personnel and patients.

The author, who is principal physicist to the Westminster Hospital, London, has had a long experience in hospital work, and has developed his facts with a true appreciation of the dual responsibility of physicist and radiotherapist.

The book shows evidence of careful assembly of material, and is well illustrated with diagrams and plates. Many important numerical data for everyday use are interspersed in tables within the text, and in a series of appendices.

In a foreword, Sir Stanford Cade writes: "The need for Dr. Wilson's book has increased since the publication of the first edition through the general increase in the use of radiotherapy and through the better training of the radiotherapist. The book is indispensable as a source of information to the student, and as a guide both to the radiotherapist and the hospital physicist. The new edition will enlarge its scope of usefulness and is assured of a fully deserved popularity." With all of this we heartily agree.

The Pregnancy Toxæmias or the Encymonic Ateliositeses. By G. W. Theobald, M.A., M.D. (Cambridge), F.R.C.S. (Edin.), F.I.C.S., F.R.C.O.G., M.R.C.P. (Lond.); 1955. London: Henry Kimpton. 10" x 6", pp. 502, with 50 illustrations. Price: 63s.

IN spite of the many advances of modern medicine, eclampsia remains "the disease of theories". At least two new books have been published in the United Kingdom in the last three years with the object of elaborating an hypothesis firmly held by the author. The first was J. Sophian's "Toxæmias of Pregnancy" (1953). The latest of such volumes, "The Pregnancy Toxæmias or the Encymonic Ateliositeses", by G. W. Theobald, is, in spite of its alarming subtitle, eminently readable though distinctly provocative in parts.

It would be impossible in a brief review to summarize Theobald's hypothesis concerning the ætiology of pregnancy toxæmia, for it ranges far beyond the ordinary concepts of disturbed water and electrolyte balance, vasopressor influences and cerebral dysrhythmia. Incidentally, it is pleasing to find the clear statement that there is no real evidence that eclampsia is caused by a toxin at all—an opinion with which many would agree. Briefly, Theobald calls attention to the protean manifestations of pregnancy toxæmia and states that any concept which is incapable of accounting for all accredited clinical facts must either be discarded or suitably modified. His main conclusion is that eclampsia represents a failure of adequate adaptation by the mother to the "pregnancy-lactation syndrome", and much of the book concerns the reasons for such failure of adaptation.

The clinical section of the book is a mixture of sound bedside observation and interpretation, and data presented with the object of showing the fallaciousness of alternate hypotheses including those of Sophian.

This is a thoughtful book; the author's sincerity is evident, and his contribution to this problem (if accepted) is more concerned with the prevention of severe pregnancy toxæmia than with alternative methods of dealing with an established case. Time will show whether Theobald's concept of a failure of adaptation to pregnancy (and the factors leading thereto) is supported by further studies in reproductive physiology. In the meantime, it is now evident that the time has passed when specious hypotheses concerning mysterious toxins can be put forward to explain pregnancy toxæmia. Theobald's thoughtful and well-documented synthesis is a far cry from earlier attempts to explain the origin of this syndrome.

Sex Problems and Personal Relationships. By E. Parkinson Smith and A. Graham Ikin, M.A., M.Sc.; 1956. London: William Heinemann (Medical Books), Limited. 7½" x 5", pp. 158. Price: 10s.

THIS is a disappointing book. The authors have some wise things to say on a subject of wide interest and concern, but in their eagerness to say them they have allowed their literary style to become cloudy and cumbersome. Any attempt to read the book aloud, the acid test of clarity, will provide many difficult hurdles for reader and listener alike. It is difficult to imagine how those by whom the book is "intended to be read" could be expected to disentangle the many long and involved sentences, especially in the second part, some more than 90 words and one (in the preface) 119 words long.

Chapter I, "The Task of Sex Education Today", has much to say about the obligations of parents in the proper early

sex education of their children, but neglects to emphasize one of the greatest tasks, the giving to all young people a first-class education and training for this privilege of parenthood. In Chapter II, "Christianity and Sex", the writer discusses the Christian ethic and its application to divorce, contraception and homosexuality, but omits the Christian conviction of the value and dignity of human personality on which the Christian ethic and the Christian attitude to personal relationships depend. Chapter XI opens with the rather surprising statement that none of the many statements in connexion with homosexuality makes mention of the contributory factor of the relation of the boy to his mother. One would imagine that this factor was almost universally realized and accepted in these days.

Medical practitioners and others who have taken any interest in these subjects will find little in this book which they do not already know. With skilful editing and drastic use of the blue pencil it might become more worthy of recommendation for the many good things it contains. As is pointed out in the preface, the problem is certainly "in the air" in this generation. As it is at present, this latest addition to "the spate of books" seems likely to leave it there.

Notes on Books, Current Journals and New Appliances.

Neurology and Psychiatry in Childhood. Proceedings of the Association, December 10 and 11, 1954, New York, N.Y. Research Publications, Association for Research in Nervous and Mental Disease. Volume XXXIV. Editors: Rustin McIntosh, M.D., and Clarence C. Hare, M.D.; 1954. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 6", pp. 517, with many illustrations. Price: £6 1s.

THIS book on neurology and psychiatry in childhood is one of the research publications of the Association for Research in Nervous and Mental Disease. It records the proceedings of the association on December 10 and 11, 1954. The papers read are followed by a précis of the discussion and are divided into five groups. The papers in Part I deal with infections of the central nervous system. Part II is concerned with developmental and traumatic aspects, Part III with functional and degenerative disturbances, and Part IV with röntgenographic aspects. The last part, in some ways the most important, deals with psychiatric aspects.

Annual Review of Medicine. By David A. Rytand, Editor, and William Creger, Associate Editor. Volume VII; 1956. California: Annual Reviews, Incorporated. 6" x 9", pp. 619. Price: $7.50.

THIS volume is one of a well-known series. The editor and associate editor come from the Stanford University School of Medicine. There are twenty-six chapters in this volume and each has one or more authors. The last of the chapters is an annotated list of reviews in medicine; it will be found particularly valuable to those who are searching for material on special subjects. Among the other subjects discussed may be mentioned viruses of the upper respiratory tract, nutrition and nutritional disorders, psychiatry, advances in the treatment of sterility, sympathetic blocking agents, diseases of the kidney, neoplastic diseases, pædiatrics, audiology, and applied preventive medicines. This is the kind of book which practising physicians should have on their shelves.

CORRIGENDUM.

AN error has occurred in the issue of September 1, 1956, at page 346; over the last "Note" in the first column, the wrong heading was used. The heading published had to do with a book entitled "Cardiovascular Surgery". The correct heading is as follows:

Cardiovascular Surgery: Studies in Physiology, Diagnosis and Techniques. Proceedings of the Symposium held at Henry Ford Hospital, Detroit, Michigan, March, 1955. Edited by Conrad R. Lam, M.D.; 1955. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 10" x 6½", pp. 572, with many illustrations. Price: £6 7s. 6d.

We regret this mistake.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Mental Health Planning for Social Action", by George S. Stevenson, M.D., Sc.D.; 1956. New York, Toronto, London: McGraw-Hill Book Company, Incorporated. 6" x 9", pp. 369. Price: $6.50.

Intended for "all who work and plan for mental health".

"The Office Assistant: In Medical or Dental Practice", by Portia M. Frederick and Carol Towner; 1956. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 8" x 5¼", pp. 358, with illustrations. Price: 47s. 6d.

The "office assistant" is "the girl who works in a medical or dental office". The book deals with every aspect of her work.

"The Surgical Clinics of North America", Lahey Clinic Number; 1956. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical), Limited. 9" x 6", pp. 269, with many illustrations. Price: £8 2s. 6d. *per annum* in cloth binding and £6 15s. *per annum* in paper binding.

Consists of a symposium on surgical technique. There are 28 contributions and 24 contributors.

"Handbook of Legal Medicine", by Louis J. Regan, M.D., LL.B., and Alan R. Moritz, M.D.; 1956. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical), Limited. 8¾" x 5¾", pp. 201, with illustrations. Price: 43s.

Intended for lawyers and medical practitioners.

"The Surgery of Childhood for Nurses", by Raymond Farrow, M.A., B.M., B.Ch. (Oxon.), F.R.C.S. (Eng.); 1956. Edinburgh and London: E. and S. Livingstone, Limited. 8¾" x 5¾", pp. 321, with illustrations. Price: 25s.

Aimed at directing the nurse's attention to the fundamental features of surgical conditions of childhood.

"Aspects of the Anatomy, Biochemistry and Pathology of the Nervous System"; a symposium dedicated to Sir Charles Putnam Symonds; reprinted from *Guy's Hospital Reports*, Volume CV, Number 1, 1956. 10" x 6", pp. 152, with illustrations.

Taken from the special issue of *Guy's Hospital Reports* dedicated to Sir Charles Putnam Symonds.

"Physics, Psychology and Medicine: A Methodological Essay", by J. H. Woodger, D.Sc.; 1956. Cambridge University Press. 7¼" x 5", pp. 156. Price: 8s. 6d.

The outcome of three lectures given to staff and senior students at the Middlesex Hospital Medical School.

"Synopsis of Genitourinary Diseases", by Austin I. Dodson, M.D., F.A.C.S., and J. Edward Hill, M.D.; Sixth Edition; 1956. St. Louis: The C. V. Mosby Company. Melbourne: W. R. Ramsay (Surgical), Limited. 7¾" x 5", pp. 330, with 124 illustrations. Price: £2 13s. 3d.

First produced in 1934.

"L'Acupuncture", par le Dr. Roger de la Fuÿe; 1956. Presses Universitaires de France. 7" x 4½", pp. 128, with illustrations.

Deals shortly with the history of acupuncture.

"Handbook of Poisons", by Robert H. Dreisbach, M.D., Ph.D.; 1955. California: Lange Medical Publications. 7" x 4", pp. 433. Price: $3.00.

The author claims in the preface that nothing similar to this book and of comparable scope is available.

"Recent Advances in Pharmacology", by J. M. Robson, M.D., D.Sc., F.R.S.E., and C. A. Keele, M.D., F.R.C.P.; Second Edition; 1956. London: J. and A. Churchill, Limited. 8" x 5¾", pp. 603, with 66 illustrations. Price: 40s.

The first edition appeared in 1950.

"The Cow Jumped Over the Moon: Private Papers of a Psychiatrist", by R. S. Ellery; 1956. Melbourne: F. W. Cheshire. 8¾" x 5¾", pp. 287. Price: 18s. 9d.

An autobiography of the late Dr. Reginald Spencer Ellery.

The Medical Journal of Australia

SATURDAY, SEPTEMBER 22, 1956.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE QUALITIES OF A SURGEON.

THE word "surgery" in its original Greek form means literally "hand work"; and so the Concise Oxford Dictionary defines it as "manual treatment of injuries or disorders of the body, operative therapeutics . . .". The definition is fundamentally valid, whether it is applied to pre-historic skull trephiners or modern neurosurgeons, to those who cut for the stone in Hippocratic times or those who can remodel a distorted heart or a mutilated face in our own day. Nor has it been invalidated by a succession of great advances: the development of exact anatomical knowledge, the careful observation of pathological changes, the application of antisepsis and asepsis, the discovery and increasing development of anæsthesia, the introduction of chemotherapy, and the appreciation of fundamental relevant principles of physiology and biochemistry. The surgeon's special work is the work of his hands or he ceases to be a surgeon. At the same time the definition is incomplete; it must not be allowed to limit the field of the surgeon's activity, or he ceases to be a real doctor. Sir Heneage Ogilvie has pointed out[1] that surgery is a branch of medicine, and its separation is one of convenience rather than necessity. He writes:

> There is no iron curtain where medicine ends and surgery begins, but rather a wide and ill-defined no-man's-land in which some of the most interesting provinces of the whole realm of healing are to be found, a zone sometimes the scene of pitched battles, but usually visited by tourists from both territories, and in parts filled by colonists who owe a double allegiance.

Thus a more satisfactory definition of surgery might be "a branch of medical practice involving manual treatment".

Having cleared this point, we may then ask what qualities go to make up the good surgeon. Many people have answered this question, but perhaps no one better than Thomas Gale,[1] who wrote nearly four hundred years ago:

> The Chirurgian must also in theis his operations observe five thynges principally. First, that he doeth it safelye, and that wythout hurte or damage to the pacient, secondly, that he do not detract tyme or let slepe good occasious offered in workyng, but with suche spede as arte wyll soffer, let hym finishe his cure. Therdly, that he work jently, courtyously, and wyth so lytle payne the pacient, as conveniently you may, and not roughly, butcherly, rudlye, and wythout a comlenes. Forthly, that he be as free from crafte and deceyte in all his workynges, as the East is from the Weaste. Fiftly, that he taketh no cure in the hande for lucre or gaynes sake only, but rather for an honest and competent rewarde, with a godly affection, to doe his diligence. Laste of all, that he maketh no warrantyse of suche sicknes, as are incurable, as to cure a Cancer or ulcerate, or elephantiasis confirmed: but circumspectleye to consider what the effecte is, and promyse no more then arte can performe.

This is admirable, and needs no comment beyond pointing out that in Gale's day the surgeon, unless he was grossly callous, was forced to work "jently" and "with spede" by the fact that his patient was conscious. Every operation must indeed have been for patient and surgeon alike an ordeal to which they had to adjust themselves as best they could. In this respect there comes to mind the moving courage of the Scotch woman Ailie during the removal of her breast, as Dr. John Brown described it in "Rab and his Friends", and Samuel Pepys's custom of celebrating the anniversary of his cutting for the stone. On the other hand, the surgeon sometimes had another point of view, as is seen in the Hippocratic description of cauterizing hæmorrhoids (Francis Adams's translation): "When the cautery is applied, the patient's head and hands should be held so that he may not stir, but he himself should cry out, for this will make the rectum project the more." On this particular point no doubt most patients would have cooperated with enthusiasm. Rather different was the procedure for dealing with a "condyloma" at the anus, which the Hippocratic surgeon was enjoined to remove with his finger "without the patient's knowledge, while he is kept in conversation". Obviously this means without the patient's prior knowledge, although even at that he must surely have suspected that something not entirely pleasurable was about to be done to him.

The surgeons of the past certainly needed not only speed and gentleness, but finesse and inflexible determination; and so do modern surgeons, though not entirely for the same reasons. I. S. Ravdin,[2] in a discussion on the management of carcinoma of the large bowel, has quoted Lewis Mumford, the American writer on contemporary social problems, who states in his book "The Condition of Man": "One must not merely feel for the suffering of other men, but like the physician, know what is good for them even if that knowledge leads to a remedy so

[1] In an article on "Surgery" contributed to "A Guide to Medicine", by Ivo Geikie-Cobb, Harrap, 1950, page 341.

[1] Quoted by Robert Coope in "The Quiet Art", Livingstone, 1952, page 200.

[2] *Surg., Gynec. & Obst.*, March, 1956.

drastic that it involves the physician no less than the patient." Most people heartily dislike "being done good to", and the attitude is not without merit. Certainly it should not be swept arbitrarily aside in a democratic community, as sometimes seems inevitable in the Welfare State. When, however, the patient places himself in the surgeon's hands, the surgeon must be prepared to exercise responsible and informed judgement, reach a firm decision and act according to his conviction and conscience, taking into account the patient's best interests and his own technical ability to meet them. Ravdin uses Mumford's comment to emphasize his considered views on the approach to carcinoma of the colon. If it is accepted that 100% of the patients suffering from this condition will have died in a few years if nothing is done, and that a very considerable number of them will have a long period of survival, or even cure, if a really radical procedure is undertaken, then (as Ravdin sees it) the mandate of the surgeon is clear and unequivocal. "Surgeons must search themselves that the motives which lead them to do lesser operations for a disease which will kill 54,000 or more of our people [in the United States] this year are not conditioned by an initial lower mortality, or an immediately grateful patient. The surgeon should do those procedures best calculated to get the patients well and keep them well."

This attitude presupposes the necessary technical competence to do what is required. The surgeon needs skill of a high order in all phases, operative and non-operative, of his work; and his conscience must subdue his pride when he knows that in one or another phase his skill needs to be supplemented or even superseded by that of someone else. The technical demands of surgery are well summed up by Ralph F. Bowers[1]: ". . . a technique of the dexterous use of the hands, and agility, gentleness, meticulosity, astuteness, thoroughness, and the ability to develop velocity without losing gentleness." Bowers lays much stress on gentleness ("one must accept the 'old maid' type of gentleness without blushing"), and suggests that most often speed is not so important. Nevertheless, on occasion speed in gentle hands will save the patient's life, "and the operator must be able to use velocity if that is necessary, very much like a musician who interprets the adagio as meaningly and beautifully as the vivace, in that he must be capable of employing both; one without the other is not enough". The musician accepts the need for constant practice and intelligent self-discipline; how much more should the surgeon, who plays upon the strings of life and death. The burden of the responsibility of surgery can be borne lightly and yet with a good conscience by the happy few with great natural gifts of skill and judgement. Others do better to leave it alone altogether. The great mass of aspiring surgeons in between may take heart from Lister's words[2] in a letter to his father in 1854 (he was then aged twenty-seven years):

> I must not expect to be a Liston or a Syme, still I shall get on. Certain it is, I love Surgery more and more, and this is one great point; and I believe my judgment is pretty sound, which is another important point. Also I trust I am honest, and a lover of truth, which is perhaps as important as anything. As to brilliant talent, I know I do not possess it; but I must try to make up as fast as I can by perseverance.

[1] *Surg., Gynec. & Obst.*, January, 1956.
[2] Quoted by Robert Coope, *loco citato*, page 69.

Current Comment.

MEGALOBLASTIC ANÆMIA AFTER TOTAL GASTRECTOMY.

THE secondary complications arising after total gastrectomy, though several, are not generally severe. Possibly the most important is the effect upon red cell formation and the predisposition to the various types of anæmia. No general agreement exists on the importance of the anæmias as a post-gastrectomy complication. However, the widely accepted view that megaloblastic anæmia arises from a failure either of absorption or of adequate metabolism of the extrinsic factor or vitamin B_{12}, leaves little doubt that removal of the stomach may result in deficient absorption of the extrinsic factor with a subsequent anæmia, identical in every way with pernicious anæmia. The post-gastrectomy megaloblastic anæmia is made more likely if it is accepted that the fundus of the stomach is probably concerned with the formation of intrinsic factor, so that the problem is not simply one of deficient absorption of the extrinsic factor. Early reports did not tend to confirm the likelihood of megaloblastic anæmia after total gastrectomy. J. M. Farris, H. R. Ransom and F. A. Coller,[1] in reviewing the progress of a series of such cases, found that there was no experimental evidence that removal of the stomach would produce pernicious anæmia, though there was occasionally some interference with the metabolism of iron. However, occasional cases of megaloblastic anæmia were reported from time to time, and F. H. Bethell *et alii*[2] and M. E. Morgans *et alii*[3] reported on the successful use of folic acid in these cases. Moreover, M. Paulson, C. L. Conley and E. S. Gladsden[4] aspirated the intestinal juices from the jejunum of three patients who had undergone total gastrectomy, and, by administration of the juice to a patient with pernicious anæmia, they were unable to obtain a hæmatological response. From this, they concluded that no intrinsic factor was produced when the stomach had been removed. They also suggested that the long delay in the occurrence of megaloblastic blood changes after total gastrectomy was attributable to large stores of the essential metabolite sufficient to last for several years.

N. S. Conway and H. Conway[5] closely investigated one patient in whom a megaloblastic anæmia was detected three years after total gastrectomy. The responses both to liver injections and to the administration of vitamin B_{12} were sufficient to correct the anæmia partially, but the addition of folic acid was necessary to restore the blood to normal. This finding seems to suggest that the post-gastrectomy megaloblastic anæmia is not physiologically identical with pernicious anæmia, but has some of the characteristics of the macrocyte anæmias of pregnancy, and those of non-tropical and tropical sprue, which respond to folic acid far better than to vitamin B_{12}.

However, the degree of the hazard to the patients after total gastrectomy still remained obscure, though R. M. MacDonald *et alii*,[6] in a review of published records after gastrectomy, found that of 53 patients who survived for three or more years after total gastrectomy, at least 12 developed a macrocytic anæmia. The evidence of anæmia, even after partial gastrectomy, led C. Wells and I. W. Macphee[7] to recommend that gastric resection should be more limited.

L. D. MacLean and R. D. Sundberg[8] suggest that in view of the recent work on the origin of the megaloblastic anæmias, the infrequent occurrence of pernicious anæmia

[1] *Surgery*, June, 1943.
[2] *Univ. Hosp. Bull. Ann. Arbor.*, May, 1946.
[3] *Lancet*, July 26, 1947.
[4] *Am. J. M. Sc.*, September, 1950.
[5] *Brit. M. J.*, January 27, 1951.
[6] *New England J. Med.*, December 11, 1947.
[7] *Brit. M. J.*, November 13, 1954.
[8] *New England J. Med.*, May 10, 1956.

after total gastrectomy may be the result of an extragastric source of intrinsic factor, or that the events leading to megaloblastic anæmia may be more complex than previously thought. A factor of importance in the avoidance of megaloblastic anæmia is the relatively poor longevity of patients who undergo total gastrectomy. The authors have made a study of patients who had undergone a microscopically proven total gastrectomy at the University of Minnesota Hospital up to June, 1954. Of 12 such patients who did not receive prophylactic treatment for pernicious anæmia, and who survived for over three years, 11 were found to have a megaloblastic bone marrow. In four other similar cases from a neighbouring hospital, the onset of the marrow abnormality did not occur in less than three years after operation. Prior to operation, five patients in the series had free acid present in the stomach. Further studies with radioactive vitamin B_{12} revealed that of the six subjects tested, each was unable to absorb the vitamin by mouth after the total gastrectomy unless intrinsic factor was added. It is suggested that the site of intrinsic factor production is in the body and fundus of the stomach; the antrum plays no part in the process. The histological findings were in each case identical with those of pernicious anæmia, and in each there was a complete response to the administration of vitamin B_{12}. The hypothesis put forward by Conway and Conway that the post-total gastrectomy megaloblastic anæmia is related to that of the sprues is not substantiated. MacLean and Sundberg conclude that a megaloblastic anæmia indistinguishable from pernicious anæmia is a late, but inevitable, sequela in patients after total gastrectomy, to whom prophylactic liver and vitamin B_{12} are not given and who survive for over three years. The one patient of the series in whom this did not occur died after three years, so that no contradistinction to the general conclusion is possible. It would thus appear that after total gastrectomy, patients who survive for three years should be subsequently given prophylactic therapy, and subjected to investigations appropriate to the prevention of megaloblastic macrocyte anæmia of the pernicious type.

Rh NOMENCLATURE.

In 1937, when the first report[1] of the Committee on Blood Grouping Tests of the American Medical Association was prepared by Ludwig Hektoen, Karl Landsteiner and A. S. Wiener, only the four ABO groups and the three MN types were in use. In 1952 a second report[2] on blood grouping tests was prepared for the Committee on Medico-Legal Problems by L. Davidsohn, P. Levine and A. S. Wiener to cover the advances made in the interval. A third report[3] has now appeared, a "Tentative, Supplementary Report", prepared by A. S. Wiener, R. D. Owen, Clyde Stormont and Irving B. Wexler, with the purpose of reviewing further developments in the field during the period 1952-1955. It commences with a long discussion of the nomenclature of the "Rh-Hr" groups. For some years this has been a matter of controversy, largely owing to the attacks made by Wiener on the CDE nomenclature. The discussion is a recapitulation of the arguments used in these attacks and concludes with the following astounding recommendation:

> This committee therefore recommends that the CDE notations for the Rh-Hr types be discarded, and that, on approved medico-legal reports, unless and until some other convention is agreed upon, the original Rh-Hr nomenclature be retained as the sole nomenclature for this blood group system.

The alleged reason for this recommendation is that the adoption of one uniform nomenclature for medico-legal reports is most desirable. This is true enough, but one cannot draw out leviathan with a hook; the complexity of the Rh groups cannot be tailored to suit medico-legal requirements. It is surprising that the Committee on Medico-Legal Problems should permit itself to be involved in the very one-sided controversy about Rh nomenclature. To understand this controversy, it must be remembered that in 1945 Professor R. A. Fisher, F.R.S., a geneticist working in England, showed that there were six Rh antigens and that these fell into three pairs. He used the following symbols to indicate this grouping: C,c; D,d; E and e. A notation based on Fisher's theory has developed side by side with the original Rh notation. The subject has been found to be so complex that at present, in both notations, subgroups must be denoted by a rather cumbrous assortment of suffixes and affixes. P. L. Mollison[1] considered that Fisher's nomenclature was much simpler to follow than that of Wiener. He wrote that:

> In Fisher's nomenclature the antibodies equivalent to the various antigens of the Rh system are designated by adding the prefix "anti" to the antigen concerned. For example, the antibody equivalent to the antigen e is anti-e. It is thus easy to see, for instance, that this antibody reacts with a blood sample of the type CDe/cDE—in fact with any blood which contains the antigen e. In Wiener's terminology the position is not so simple, and this can be illustrated by translating the same example into his terms. Anti-e in Wiener's terminology is anti-hr. The genotype CDe/cDE is R_1R_2. No separate letters are assigned to the elementary antigen so that "e" cannot be described directly.

R. R. Race and R. Sanger[2] state that:

> Fisher's theory has now been completely confirmed in every detail and is accepted universally. Numerous attacks on the theory by Wiener have in fact been attacks concerning the highly academic and interesting point whether the three allelomorphic sites of Fisher are to be placed within or without the boundary of one gene.

Race and Sanger also state that:

> Both the CDE and the short symbols have been used without change for five years by all workers in Britain. Wiener's notation has undergone minor changes every year and we feel no confidence that it has yet reached stability.

With Landsteiner and Peters, Wiener shares the great honour of having discovered the Rh factor, and he has been one of the committee chosen to draw up the three reports on blood groups referred to above. It is indeed a pity that so great a scientist should expend his valuable energy in a fruitless and one-sided controversy on nomenclature.

As well as a discussion on nomenclature, the new report includes a description of certain recently discovered blood factors and blood groups and their medico-legal applications, a discussion of the use of blood tests as substantial evidence of paternity as well as for the exclusion of parentage; and also a suggested model blood test law.

[1] *J.A.M.A.* (1937), 108: 2138.
[2] *J.A.M.A.* (1952), 149: 639.
[3] *J.A.M.A.* (1956), 161: 233.

HAZARDS OF TANKS AND PITS.

Not infrequently tragedies or near tragedies occur in industrial and municipal service when workmen are overcome and intoxicated or asphyxiated by the gaseous contents of pits and tanks in which, by nature of their occupation, they have to work. The suddenness of the onset of unconsciousness and the involvement of bystanders who seek to help prevent the rescue in time of the workmen and would-be rescuers. The inhaled air in the enclosed areas may appear to be innocuous, and ignorance of the physics of ventilation encourages the worker to enter blithely and without apprehension into his own death chamber.

S. Moskowitz and W. J. Burke,[3] of the New York State Department of Labour, have reviewed the hazards atten-

[1] MOLLISON, P. L. (1951), "Blood Transfusion in Clinical Medicine", p. 187. Blackwell Scientific Publications, Oxford.
[2] RACE, R. R., and SANGER, RUTH (1950), "Blood Groups in Man", pp. 82 and 106. Blackwell Scientific Publications, Oxford; 1950.
[3] *Arch. Indust. Health*, April, 1956.

dant upon the workers in tanks and pits. Simple asphyxiants are the inert gases which dilute the oxygen content of the atmosphere. If the oxygen falls below half the normal concentration, unconsciousness and death may result in a short time. Permanent damage to the brain or nervous system may be caused, even if death does not result. The systemic asphyxiants, such as carbon monoxide and the cyanides, act by interfering with the physiological usage of oxygen. The anæsthetic gases may leave a very small margin between unconsciousness and death, and some have, in addition, a toxic effect upon organs. Despite the large opening at the top there may be little natural circulation of air from the outside of pits and tanks, and even with the addition of gases of density very little greater than that of air, there is sufficient weight to settle into the open tank or pit. Examples of relatively light mixtures, which are nevertheless incompatible with life, are dilutions of carbon tetrachloride, tetrachlorethylene and benzol. Asphyxiation may occur in farm workers who enter silos or in the workers who enter the vats of the brewing industry. The gas mask can obviously afford no protection in asphyxiating atmospheres, which may arise where any aerobic fermentation process is taking place. Municipal manholes may have a high carbon monoxide concentration, a high proportion of inflammable gases, and a low concentration of oxygen. The odour of intoxicants, such as hydrogen sulphide, may be masked by the even more powerful odour of such processes as tanning. Hydrogen sulphide fatalities have also occurred during tunnelling operations through rock containing iron pyrites with a slight acid underground water flow. Deaths due to intoxicant paints in the presence of insufficient air circulation have occurred during the painting of the insides of tanks.

The authors suggest various precautions which should be taken to prevent acute intoxication or asphyxia in workers in tanks or pits. The worker should wear a harness to which is tied a rope or cable held by a second man outside the tank. A third man should be within hailing distance, so that the man in the tank can be quickly hauled out if he shows any signs of distress. Tanks and pits should be completely emptied of all volatile material and should be washed, steamed or aerated repeatedly before they are entered, and even then only when the atmosphere is tested and found to be safe. Many instruments are available for the rapid estimation of atmospheric contaminants, and a modification of the miner's lamp is used for the test of oxygen sufficiency. If the removal of contaminants is impossible, a source of respirable air or oxygen must be supplied through a face mask. Where operations necessarily yield volatile contaminants in a confined space, scientifically devised exhaust ventilation should be provided. Protective clothing should be provided when absorption of contaminants through the skin may occur.

In the industrial processes in which the hazards of working in confined spaces are well known, precautions are usually adequate and accidents occur only when workers have not obeyed the local regulations. Tragedies which do occur are usually confined to unsupervised groups of men who are not familiar with the dangers of their work, and who rapidly turn a single fatality into a multiple tragedy by misguided attempts to effect a rescue without adequate precautions.

WOUNDS OF THE HEART.

WOUNDS of the heart are usually caused by the penetration of missiles or of knives or daggers. Wounds also occur as part of generalized injuries in motor-car accidents, crushing injuries, and falls from great heights. When the heart is injured as part of the general bodily trauma, death is instantaneous or rapid. Interest surrounds the isolated wounds of the heart in which treatment may prevent death. Recent communications have tended to confirm the impression that the heart is sometimes able to withstand a surprising degree of trauma. Death, when it occurs, is often due to bleeding, either into the thoracic spaces with interference with respiration, or into the pericardium with constriction of the heart. In view of the relative delicacy of the cardio-vascular system, it is surprising that the patient may be capable of considerable activity before death finally occurs. This period of survival will sometimes be sufficient for the institution of life-saving measures. R. A. Griswold and C. H. Maguire[1] found that, provided the patient survived as far as the operating table and did not succumb to hæmorrhage, death was unusual. If the operation was survived, the most frequent fatal complication was cerebral damage following embolism, neglected tamponade or anoxæmia. In this early series of 27 patients with penetrating wounds of the heart still alive twenty minutes after admission to hospital, 20 survived. The same authors in a later report[2] emphasized the need for speed in dealing with cases such as these. They suggested that anticoagulants should be used when the endocardium had been damaged, or in any wound of the auricles. This was to prevent the great danger of death from cerebral embolism. A more cautious note in the treatment of penetrating injuries of the heart was put forward by D. C. Elkin and R. E. Campbell.[3] They suggested that conservative treatment should be instituted together with the administration of fluids by the intravenous route and the preparation of the patient for immediate surgical repair and blood transfusion. The active treatment consisted of relieving tamponade by pericardial aspiration, and when this measure had lasting benefit no attempt at repair was made. In this series there was one death among eighteen patients, and in this single patient who died, surgical repair of the heart had been attempted.

The ability of the heart to withstand severe trauma is well demonstrated by the report of A. S. Johnson[4] of a man who fell asleep while driving, and who sustained an injury of the chest caused by impact with the steering wheel. The chest wall was not penetrated, but subsequent exploration revealed the heart extruded completely from the ruptured pericardium and lying in the left hemithorax. The whole was repaired and the patient recovered completely. J. M. Chamberlain, D. M. Carberry and P. L. Stefko[5] point out that cardiac tamponade is less likely to occur when the tear in the pericardium is large, so that blood can escape externally into the mediastinum or into the adjacent pleural cavity. However, if the wound in the cardiac vessels or myocardium is also small, bleeding may cease very quickly by clotting. They recommend that an emergency radiograph of the chest should be taken before surgical treatment is contemplated. A severe hæmothorax signifies severe damage to some vital organ, and indicates the need for blood transfusion and aspiration of free blood in the thorax prior to exploration. Chamberlain *et alii* consider that the importance of tamponade in causing death, although significant, has been previously over-emphasized. Like Elkin and Campbell, they consider that thoracotomy is not a necessary routine procedure in hæmopericardium, which has little relation to subsequent chronic constrictive pericarditis. This suggestion is borne out by the findings of J. C. Drye, W. S. Coe and J. P. Staner.[6] They investigated the subsequent course for three to twenty years of 20 patients who recovered from heart wounds. No case of constrictive pericarditis or of false aneurysm occurred. Six of the patients developed organic heart disease of the hypertensive arteriosclerotic type, none of which could be attributable to the previous stab wound. The wheel has thus turned almost full circle from hopelessness, to routine repair, to wary conservatism. Surgical treatment offers no further hope for patients in whom the main coronary circulation has been injured. For the patients who come alive into the care of the surgeon, the treatment would appear to be that necessary to stop continuing hæmorrhage and to

[1] *Surg., Gynec. & Obst.*, 74: 406, 1942.
[2] *Am. J. Surg.*, November, 1947.
[3] *Ann. Surg.*, May, 1951.
[4] *Am. J. Surg.*, April, 1956.
[5] *Am. J. Surg.*, April, 1956.
[6] *Am. J. Surg.*, April, 1956.

relieve cardiac and pulmonary embarrassment if these appear. Otherwise, the treatment is conservative and the outlook hopeful.

HEPARIN AND ATHEROSCLEROSIS.

EVIDENCE of the importance of the serum lipoproteins in the causation of atherosclerosis has been discussed many times. The factors conducive to atherosclerotic changes in blood vessels have been investigated and described fully, and at present no other subject is attracting more medical interest. After a somewhat stormy introduction the anticoagulants have come into frequent use both in the immediate stage of recovery from myocardial infarction, and in selected cases in which their use has been continued indefinitely with some benefit, though not without difficulties. While the most recent researches may lead to conclusions whereby atherosclerotic changes may be halted or delayed, there is no real indication of any treatment likely to reverse the process. Some years ago it was suggested that heparin therapy, by occasional injections and in doses insufficient to have any profound anticoagulant action, might, by some means or other, have an effect of a beneficial kind upon the abnormalities in the walls of the diseased blood vessels. Claims were made that heparin given in this way considerably lessened the angina of effort of coronary ischæmia, and this implied that the lumen of the coronary blood vessels had been increased by the reduction of the atheromatous deposits. However, further investigation in this field did little to substantiate the good effects of heparin, and workers such as O. H. Davies and D. W. Barritt[1] were unable to find any evidence that heparin produced any alleviation of the symptoms of *angina pectoris*.

Nevertheless, a long-term study of the effect of heparin in patients with coronary atherosclerosis has now been reported by H. Engelberg, R. Kuhn and M. Steinman.[2] They were more concerned with the influence of heparin upon the circulating lipoproteins than upon the subjective sensations of angina, and they based their study on the supposition that atherosclerosis is the underlying disease process in 85% to 90% of patients who have already sustained a myocardial infarction, or who have typical *angina pectoris* with abnormal electrocardiographic findings. Accordingly, 200 patients of this type were separated into two groups. To each patient of one group were given 200 units of heparin in a concentrated aqueous solution by the subcutaneous route twice weekly, and to the other was given a placebo of isotonic saline in a similar manner. Anticoagulant drugs were not used orally, nor was the fat in the diet specially restricted. The treatment was continued for two years and patients were each examined by electrocardiography and ballistocardiography. Estimations were made of serum cholesterol and of ultracentrifugal lipoproteins. In the control group during the two years of the study, there were 18 non-fatal recurrences and 21 deaths due to cardio-vascular causes. In the heparin group there were five non-fatal recurrences and four deaths due to cardio-vascular causes. The death rate in the control group was about the expected 10%, while in the heparin-treated group it was less than 2·5%. Symptomatic improvement occurred in 25% to 35% of the control group and in twice as many of the heparin group. Moreover, improvement continued in the treatment and regressed in the control group. One non-fatal case of major hæmorrhage occurred and was due to the heparin, and there were several cases of minor bleeding episodes—in this instance, protamine sulphate given intravenously proved most efficacious. Two heparin-treated patients developed thrombophlebitis of the leg veins. Some reduction in insulin requirement was noted in diabetics treated with heparin. Little or no effect was found on the clotting time. Usually there was only a temporary reduction of serum lipoprotein levels after heparin, but in a few patients a low level of low-density lipoproteins tended to persist. Cholesterol levels varied little. The authors conclude that the good results of the heparin were due to the lowering of levels of low-density lipoproteins and acceleration in the removal of fat from the blood-stream which, in turn, resulted in reduction in the formation of fat sludge on the endothelium, and a more normal carbohydrate metabolism was facilitated. In addition, they suggest that heparin may prevent the formation of minute mural thrombi. These results are particularly interesting in that the heparin, in this particular series, appears to have been at least as effective in preventing further myocardial infarction as the orally administered anticoagulants of other workers. Of particular advantage is the relative safety of heparin in this dosage.

[1] *Lancet*, June 5, 1954.
[2] *Circulation*, April, 1956.

MATERIA MEDICA DURING THE MING DYNASTY.

THE Ming dynasty was founded in China in 1368 as the outcome of a popular revolution. The country gradually achieved some internal stability. By the sixteenth century, peace, economic development, and success in seaborn trade had encouraged considerable advances in the learning of Chinese *materia medica*. T. Lee[1] has given a detailed account of the achievements of Chinese pharmacology at this particular period of Chinese civilization. In the thirteenth century Li Kao had affirmed that digestion was the basic factor in health. In the fourteenth century Chu Chen-Heng was particularly concerned with the importance of dieting in the treatment of diseases. At this period, Chinese medicine paid great attention to dietetics and numerous books on *materia medica* were produced. This was not surprising considering the current Confucian philosophy which advocated investigation of things and the extension of knowledge. Early in the Ming period a large number of books were produced and a vast amount of pharmacological data was compiled; some of it was mistaken, and classification of therapeutics became considerably confused. Medical theories on the action of drugs varied; some suggested that they should be used according to the 12 vascular systems, while others classified drugs according to their ability to increase, to reduce, to float and to sink. Food substances continued to receive great attention, and in the sixteenth century Lu Ho stated that yellow grain was of great nutritional value and that the cultivation of such food should be encouraged. He was an advocate of the vegetable diet with a sparing use of meat. This followed the traditional Ming belief that meat caused too much "heat". Considerable advance was made in the careful classification of plants with special reference to their edibility. The most important *materia medica* publication was the *Pen Ts'ao Kank Mu* of Li Shih-Chen (1518-1593). This author, who had tuberculosis in his youth, was said to have taken thirty years to compile his book, and he listed 758 references in the foreword. Altogether 1892 drugs were classified from animal, vegetable, mineral and domestic sources, including 610 herbs and 180 trees. Li Shih-Chen critically investigated each drug, especially those of vegetable origin, where existed the most confusion. He carefully tested the new plants introduced into China from abroad since the tenth century. He came into direct opposition to the firmly entrenched beliefs of Taoist alchemists, who stated that the prolonged taking of certain drugs would ensure longevity. Li Shih-Chen emphasized the poisonous nature of mercury and arsenic and other drugs supposed to prolong human life. He was also strongly opposed to the prevalent belief of the spontaneous generation of life. He condemned the practice of maintaining parasitic worms in the human body to aid digestion, and noted that children fond of eating snuff of a candle wick were suffering from parasitic worms, and should be treated with parasiticides. The knowledge contained in Li Shih-Chen's work is enormous, and Lee suggests that study may reveal many drugs of value at the present day. During the rest of the Ming dynasty, numerous books followed on the preparation of drugs, and upon the subject of dietetics, until the end of this period of internal stability in the seventeenth century.

[1] *Chinese M. J.*, March-April, 1956.

Abstracts from Medical Literature.

PHYSIOLOGY.

Development of Temperature Regulation in the Dog.

C. JENSEN AND H. E. EDERSTROM (*Am. J. Physiol.*, November, 1955) have exposed newborn dogs alternately to cold and warm environments at daily intervals from the age of one day to about thirty days. The temperatures used did not cause rectal temperature changes in adults, but were sufficiently severe to disturb thermal equilibrium in the young dogs. On exposure to a room temperature of 1° to 6° C. there occurred, in the one-day-old dog, a profound fall in deep rectal temperature, similar in rate to that of a beaker of saline equal to the dog's weight. As the animal matured, resistance to the cold stress gradually increased until, at the age of about three weeks, no drop in rectal temperature occurred. Some shivering appeared at two to three days of age, and this became stronger and more prolonged as resistance to cold developed. The heart rate slowed together with the drop in rectal temperature in the newborn dog. In the older animals, the heart rate increased on exposure to cold, despite a small drop in the rectal temperature. The resistance to high temperatures was likewise poor in the newborn dog, and the body temperature of the two-day-old animal rose rapidly on exposure to 40° to 42° C. Again, the rate of temperature rise was similar to that of an equal weight of saline. Panting in response to heat appeared at the age of three days, but this did not prove to be an effective heat-loss mechanism until the age of about three weeks, when only a slight rise in rectal temperature occurred in the hot room. At the age of about four weeks most animals were able to adapt themselves to the heat with little or no change in rectal temperature. The heart rate of the newborn animals did not increase with the rise in rectal temperature, but for unknown reasons decreased slightly. In the older animals little or no change in the heart rate occurred on exposure to heat.

Cardio-Vascular Effects of Pentobarbital Anæsthesia.

C. B. NASH, F. DAVIS AND R. A. WOODBURY (*Am. J. Physiol.*, April, 1956) have investigated the effects of continuous pentobarbital anæsthesia on certain features of the cardio-vascular system in trained male dogs. Similar results were obtained in 10 animals by the pressure-pulse contour method, and in five animals by the use of a dye dilution technique. Cardiac output fell progressively during the first two to three hours; the maximum fall exceeded 44% of the control value, and was statistically significant from the one-hour observation throughout the remainder of the seven-hour experimental period. Except for the brief period during induction, the mean blood pressure did not deviate markedly from that of the unanæsthetized animal. The fall in the hæmatocrit reading during the first hour was followed by a slow partial recovery. Plasma proteins decreased, in both concentration and absolute amount, while plasma volume underwent a slight rise. The authors suggest that the widely used anæsthetic dose of 30 milligrammes per kilogram of body weight seems needlessly high, and may be expected to induce cardio-vascular changes even greater than those reported herein. This study has demonstrated clearly that a severe decrease in cardiac output occurs under continuous pentobarbital anæsthesia in the dog. While the mechanism responsible for this fall has not been elucidated, it appears likely that there may be a direct action upon the myocardium. From the data presented it seems clear that published works, which did not include specific control experiments for the effect of the anæsthetic agent used, require critical reevaluation. This precaution is especially necessary in cardio-vascular experiments involving pentobarbital anæsthesia, since the data here reported indicate that this anæsthetic agent itself produces profound changes in the cardio-vascular system.

Effect of Head Immobilization on Air-Sickness.

B. F. KEIST, W. F. SHEELEY, J. M. BYERS AND H. I. CHINN (*J. Appl. Physiol.*, January, 1956) report that paratroopers on simulated combat jumps were distributed at random aboard C-119 aircraft and divided evenly into four groups receiving, respectively (i) 0·65 milligramme of hyoscine hydrobromide, and the head was supported; (ii) 0·65 milligramme of hyoscine hydrobromide, but no head support, (iii) a placebo with the head support; (iv) a placebo without head support. Hyoscine afforded striking protection against air-sickness whether or not it was supplemented with head support. Head support, on the other hand, gave no protection.

Skinfold Thickness and Body Cooling.

P. T. BAKER AND F. DANIELS (*J. Appl. Physiol.*, January, 1956) report that by means of correlation coefficients and regression equations between skinfolds and skin and rectal temperatures, it has been demonstrated that when almost nude men are inactive at 15° C., fat acts as an insulator. Fat men, under the environmental and activity conditions described, maintain higher rectal temperatures, but have lower skin temperatures than thin men. The difference between 1% and 19% body fat produces a difference of 0·7° C. in rectal temperature and 3·3° C. in mean weighted skin temperature during two hours of exposure to cold.

Water Balance of the Camel.

B. SCHMIDT-NIELSEN, K. SCHMIDT-NIELSEN, T. R. HOUPT AND S. A. JARNUM (*Am. J. Physiol.*, April, 1956) have made observations on camels, *Camelus dromedarius*, which were exposed to prolonged periods of water deprivation during winter, spring and summer in the Sahara desert. Determinations were made of weight changes, water and food intake, urine flow and concentrations, plasma concentrations *et cetera*. It was found that the camel can tolerate a loss of water corresponding to 30% of its body weight even when exposed to the severe desert heat. Other mammals dehydrated in a hot environment may die from circulatory failure when the water loss involves 12% of the body weight. Unlike many other mammals, the camel does not lose its appetite when deprived of water, but continues to eat normally until the desiccation becomes very severe. It has a low urine output (0·5 to 1·0 litre per day when kept on a diet of dates and hay), a low water content in the fæces, and, when dehydrated in the summer, a very low evaporative water loss. When offered water the camel drinks, in ten minutes, enough water for complete rehydration. The longest period that a camel was kept on dry food, without drinking water, in the hot summer, was seventeen days. This camel was not working and it had its protective fur, which decreased the heat gain from the environment. It is concluded that the ability of the camel to withstand prolonged dehydration is attributable to its tolerance of an extremely high degree of desiccation of the body and to its low overall water expenditure. Particularly effective as a water-conserving mechanism is the low evaporative water loss during dehydration in the summer.

Oxygen Consumption of the Breathing Processes.

J. G. RAMOS AND P. ARJONA (*Am. J. Physiol.*, February, 1956) have studied the varying oxygen requirements of rabbits anæsthetized by a barbiturate, during variations in the degree of breathing activity. Breathing activity was varied by means of the Hering-Breuer reflex, by using different depths of anæsthesia, or by changes in the dead space or resistance to air flow. Measurement of breathing activity was made by mechanical or electrical integration of the electromyelograms of the diaphragm. It was found that oxygen consumption had a linear relationship with breathing activity. That relationship could be modified by changes in heart rate, by asphyxia or hyperventilation, by the degree of activity of the sympatho-adrenal system or by too much barbiturate. Once these factors were controlled it was found that oxygen consumption depended more on the integrated muscle activity than on either ventilation or breathing rate. It is emphasized that in some conditions the amount of oxygen used by the breathing processes can become an important fraction of the total basal metabolism.

BIOCHEMISTRY.

Tartaric Acid.

E. KUN AND M. G. HERNADEZ (*J. Biol. Chem.*, January, 1956) have shown that suspensions of mitochondria prepared from various tissues of rat and beef oxidize D(-) and meso-tartrate. The enzyme system was brought into solution by extraction. The reaction required diphosphopyridine nucleotide; added magnesium increased oxygen uptake and carbon dioxide evolution. The products

of the enzymatic oxidation were isolated and identified as oxaloglycolate, which yields glycoxylate. The formation of diketosuccinate, hydroxypyruvate and tartronate was also established.

Insulin.

J. ASHMORE *et alii* (*J. Biol. Chem.*, January, 1956) have determined the biochemical sequence of events in rat liver slices after injection of insulin and adrenal cortical hormone into diabetic and adrenalectomized-diabetic rats. The activity of glucose-6-phosphatase per gramme of wet liver was found to be increased over normal values in fasting and alloxan-diabetic rats. Diabetic-adrenalectomized rats were found to have normal liver glucose-6-phosphatase activity. Injection of insulin *in vivo* decreased liver glucose-6-phosphatase, while adrenal cortical hormones tended to increase liver phosphatase. The time required to change the activity of liver glucose-6-phosphatase was determined in diabetic rats injected with insulin and adrenalectomized-diabetic rats injected with adrenal cortical hormones. Six to twelve hours were required before hormone-induced changes in liver glucose-6-phosphatase activity were observed. It was found that the increased gluconeogenesis and decreased fatty acid synthesis characteristic of diabetic liver metabolism preceded any observed changes in liver glucose-6-phosphatase activity. Adrenal cortical hormones appeared to act within two hours of injection to alter the pyruvate metabolism in liver slices from adrenalectomized-diabetic rats. This is contrasted with the observed twelve to twenty-four hours' delay in changes in pyruvate metabolism, following insulin injection into alloxan-diabetic rats. Glucose-6-phosphatase activity appeared to influence the relative proportion of glucose-6-phosphatase converted into glucose and glycogen.

Tyrosine.

H. H. FALLAN *et alii* (*J. Biol. Chem.*, December, 1955) found that tyrosine-O-sulphate is a constituent of normal human urine. The average excretion was 28 milligrammes per day for five adult males, and accounted for about half of the bound tyrosine and 3% to 8% of the ethereal sulphate sulphur found in the urine.

Ascorbic Acid.

J. J. BURNS *et alii* (*J. Biol. Chem.*, January, 1956) have compared the metabolism of uniformly and carboxyl labelled L-ascorbic acid in guinea-pigs. The results show that the main route of metabolism of L-ascorbic acid involves extensive oxidation of its entire carbon chain to carbon dioxide. A smaller fraction of the vitamin is excreted in urine as ascorbic acid, diketogulonic acid and oxalic acid. The half life of ascorbic acid in guinea-pigs is about four days, compared to about eighteen days in man.

Glycogen Storage Disease.

B. ILLINGWORTH *et alii* (*J. Biol. Chem.*, January, 1956) have determined the activity of the enzyme amylo-1,6-glucosidase (debranching enzyme) in the skeletal and heart muscle of children. In two cases of generalized storage disease in which the glycogens had abnormally short outer chains, no enzyme activity could be detected. Absence of this enzyme can explain both the abnormal glycogen structure and the accumulation of glycogen in the tissues and also supports the view that this is a distinct type of glycogen storage disease. In heart and skeletal muscle obtained from three children with general storage disease in which the glycogens had outer branches of normal length, glucosidase activity was within the normal range in two of the children, while it was very low in the third.

Insulin Inactivation.

H. T. NARAHARA *et alii* (*J. Biol. Chem.*, December, 1955) have continued the study of the heat-labile insulin-inactivating system in rat liver. When the intracellular distribution in homogenates after differential centrifugation was examined, most of the activity was found to be in the residual sucrose supernatant fraction. The author suggests that the insulin-inactivating system is probably a proteolytic system with some degree of specificity; however, other substances such as α-cortico-tropin, casein, glucagon and growth hormone may also be substrates for this system.

Nitrogen Intake.

W. C. ROSE AND R. L. WIXOM (*J. Biol. Chem.*, December, 1955) have conducted experiments in normal young men for the purpose of ascertaining the approximate amount of nitrogen which is required for the synthesis of the non-essential amino acids. In these experiments the diet furnished the eight metabolic essentials, each at the safe level of intake as defined in the preceding work of these authors. Attention was drawn to the remarkable efficiency of the nitrogen present in such a mixture, in which the proportion of each component was adjusted to the needs of the organism for it. A preparation of this character when suitably supplemented with "extra" nitrogen, in the form of glycine, to provide a total daily intake of 3·5 grammes, was sufficient to maintain nitrogen equilibrium. On the assumption that 0·35 gramme of "unknown" nitrogen, in the form of contaminants of the starch and other dietary constituents, was usable, it may be calculated that the minimal nitrogenous needs of man for the synthesis of the non-essential amino acids cannot exceed 2·55 grammes daily, and probably is significantly less than this quantity.

Cholesterol.

R. P. COOK *et alii* (*Biochem. J.*, December, 1955) have extended their studies on cholesterol metabolism. Rats were fed diets having as a basis animal cake with and without olive oil (16·6%) and containing either no added cholesterol or added cholesterol (1·6%). The neutral fraction or unsaponifiable matter of the faecal extracts was analysed. Separation of the unsaponifiable matter by adsorption chromatography on alumina gave fractions consisting of saturated and unsaturated hydrocarbons, sterols, ketones and more polar compounds. The amounts of ether-extractable acids and of ester cholesterol are increased after sterol feeding. More cholesterol is absorbed when added fat is present in the diet, but the conversion into saturated sterols is greater on the low-fat diet.

Insulin-Combining Properties of Cells.

N. HAUGAARD *et alii* (*J. Biol. Chem.*, November, 1955) have studied animal cells of various types, with respect to their ability to combine with insulin, by use of a radioactive insulin preparation for the purpose of quantitative determination. For comparison radioactive serum albumin was also employed. Rabbit leucocytes were compared with other tissues combined with very large amounts of insulin; that is, 120 per 10^{10} cells compared to the value of seven observed with iodinated serum albumin. The combined insulin of rat muscle (diaphragm) under similar conditions was approximately one-fiftieth the value for leucocytes. Red cells combined about one-thousandth of the amount combined by leucocytes. The combined insulin was present mainly in the stroma. Other cells were also studied for insulin-combining properties, and the significance of the observations with respect to the problem of insulin action is discussed.

Bone Marrow.

J. R. TOTTER AND A. N. BEST (*Arch. Biochem.*, February, 1955) have investigated the uptake of isotopic formate into DNA (desoxypentosenucleic acid) and acid-soluble fractions of rabbit bone marrow *in vitro*. Glycine was found to increase the fixation of formate carbon in the acid-soluble fraction but not into the DNA. Both glucose and sodium succinate were found to increase the specific activity of the DNA as well as of the acid-soluble fraction. The amount of fixation of isotopic formate was not reduced by the addition of a relatively large proportion of choline; it was slightly reduced by betaine, sarcosine, L-methionine, L-histidine or thiomethyl adenosine; whereas the addition of DL-serine was followed by a significant fall in activity. These results are interpreted as indicating that the substances named are, in marrow, ineffective precursors of the "active 1-carbon" intermediate. Aminopterin inhibited the fixation of formate into the DNA with an unexpectedly steep dose-response curve. Inhibition was partly prevented by tetrahydroformylfolic acid but not by folic acid. Inhibition by aminopterin of formate uptake into purines of DNA was less marked than was the effect on thymine incorporation of formate carbon. The purine analogue, 2-mercapto-azahypoxanthine, appeared to inhibit uptake of formate into the purines of RNA more effectively than into purines or thymine of DNA.

Essential Fatty Acids.

J. F. MEAD AND S. WEINHOUSE (*J. Biol. Chem.*, April, 1956) have demonstrated that an unsaturated fatty acid which accumulates in male fat-deficient rats is 5, 6, 11-eicosatrienoic acid. This is presumably a reduction product of arachidonic acid rather than an intermediate in the conversion of linoleic to arachidonic acid.

On the Periphery.

MEDICO-HISTORICAL ASPECTS OF PARIS.

MEDICINE in Paris has a history as interesting as that of the city itself. Paris is so rich in its own historical treasures that it is not surprising to find exhibits of medico-historical significance in many of its museums. Incidentally, these apeal no less to the eye than to the mind, for everywhere an elegant combination of space, colour and design is as much a feature of museum display methods as it is of the shop windows in the Rue de la Paix. Perhaps because it is frequently prevented by lack of accommodation or finance, the admirable use of space is impressive in the Louvre, particularly in the display of Greek and Roman statuary.

A review of the medico-historical highlights of Paris is probably best begun in the formal atmosphere of the Faculty of Medicine in the Rue de l'École de la Médecine. The main entrance hall, with its series of busts of famous doctors, and the grand staircase leading from it, form an appropriate introduction to the Musée de l'histoire de la Médecine. This museum, although formed only in 1926—and suffering many vicissitudes before reaching its present home last year—records with particular care the history of its own faculty, reflects faithfully much of the medical history of Paris and France, and, in doing so, inevitably illustrates important aspects of the general history of medicine, particularly during the nineteenth century. From our own point of view it will repay detailed study, because its specialization in local history suggests the motif which must guide the development of medico-historical museums in Australia.

The museum is a long room with a surrounding balcony reached at the far end by a staircase which is dominated by a portrait of Guillaume Dupuytren, perhaps the greatest of French teachers. The exhibits begin with small collections of bronze Egyptian surgical instruments. A similar Roman series, mostly from the vicinity of Reims, is accompanied by a funerary urn, lamps and other relics of the period. Among curious items of the sixteenth to eighteenth centuries are some bronze mortars, a scarificator (of the familiar spring-loaded pattern, but distinctly more elaborate and decorative than later examples) and a set of golden circumcision instruments.

The remaining cases along the left-hand wall are devoted chiefly to former prominent personalities in the faculty: deans, anatomists (including Riolan, Vieussens and Winslow), surgeons (Ambroise Paré and Guy de Chauliac, for example, the latter probably the most important of mediæval surgeons), physicians (Pierre Bretonneau, who first used tracheotomy for laryngeal diphtheria, his pupil Armand Trousseau, Georges Dieulafoy, Carl Potain, all three of whom are remembered, *inter alia*, for their contributions to the problems of pleural fluid collections, Laennec, Piorry), physiologists (Flourens, François Magendie and his pupil who was to become most famous of all, Claude Bernard), neurologists (Jean-Martin Charcot, Philippe Pinel, Pierre Marie, among others), dermatologists (Fournier, Darier and Besnier are familiar names), cardiologists (a rather restricted term to include Jean Corvisart, the translator of Auenbrugger's neglected treatise on percussion, Bouillaud and Potain). Near by there are some reminders of the great French military surgeons. Finally there are cabinets devoted to Professor Gilbert (whose support was invaluable in the establishment of the museum) and to other French medical historians. Most of the men who have been mentioned are represented by pictures, engravings, autographs and their chief published works. In some cases there are, in my view, those more vital reminders of their work which add a special interest to any museum. There are, for example, some of the robes of office, including Trousseau's *toque*; a replica of Laennec's first stethoscope, a roll of paper, accompanies his earliest wooden tubular model (1816), as illustrated in his treatise. Piorry's smaller modification is shown with several later styles. Piorry's own contribution to the physician's diagnostic apparatus, the pleximeter, is represented; this is a reminder that there are also some early patella hammers, often used as plessors until the enterprising American student replaced both pleximeter and plessor by a finger of each hand. The scalpels which served at the autopsy upon Napoleon are worthy of mention.

The obstetricians commemorated, including Mauriceau and Baudeloque, serve to introduce the display of instruments which occupies the length of the opposite wall. This begins with a small collection of obstetrical forceps, which includes a pair of Smellie type, still with the leather-covered handles (probably used to reduce noise). Incidentally, Hugh Chamberlen, the translator of Moriceau's "Diseases of Women with Child", visited Paris in 1670 to demonstrate his forceps to Moriceau; the harrowing story of his failure is graphically recorded by Radcliffe. The specula of Ricord and Récamier appear beside a particularly monstrous seventeenth century model, little different from those in use in Roman times. Close inspection of a remarkable table near by shows that the peculiarly patterned top is composed of various bits of mortified animal, including four ears. There is a good collection of eighteenth and nineteenth century urological instruments, and there are amputation knives used by Paré and Guy de Chauliac. Other exhibits relate to general surgery, ophthalmology and oto-rhino-laryngology.

In the centre of the room, variously displayed, are collections of pictures of men, events and buildings of medical significance, and of documents, theses, certificates and autographs relating to Petit, Orfila, Marjolin, Pasteur, Roux and Clemençeau, to name but a few. Here, too, is the outstanding exhibit of the museum, the collections of medallions, plaquettes, mostly of bronze, and of tokens and talismans. All have some medical significance. Many were struck to commemorate the foundation or anniversary of hospitals and institutions, others to honour great teachers, doctors and scientists, or to recall important discoveries such as that of vaccination. Others again served as prophylactics against plague and other diseases, whilst some served as tokens of membership of a society. A detailed catalogue of these items would be of the greatest interest.

From the Faculty it is not far to another remarkable museum in the Hôpital du Val-de-Grâce, for over a century the headquarters of French military medicine. The buildings, dating from the early seventeenth century, were originally those of a Benedictine convent, handsomely endowed by the Queen of France in 1637 in thanksgiving for the birth of a dauphin, the future Louis XIV. During the Revolution in 1796 it became a military hospital and training school. Few hospitals could boast of a more gifted staff than that which was to work at Val-de-Grâce in the course of the next century. It is worth reviewing briefly the names and work of some of these men, for their contributions indicate something of the significance of the Paris school in the history of nineteenth century medicine. The high standard of military surgery originally set by Paré was continued during the eighteenth century by Jean-Louis Petit, de la Peyronie, Ravaton (who anticipated both Percy and Larrey in appreciating the value of mobile medical units during battle), and Parmentier, who, in addition to organizing pharmaceutical services, is stated to have made popular the cultivation of the potato. Dominique Larrey became professor of anatomy at Val-de-Grâce, while at about the same time Percy, on the administrative side, was effecting considerable reorganization of the medical services. Among his innovations was the inclusion of regular stretcher-bearers on the medical establishment. Percy's memorable exhortation to the army surgeons of 1811 is engraved on the wall of the magnificent cloisters at Val-de-Grâce, cloisters which combine history with remembrance by the juxtaposition of the names of the dead from many campaigns with busts of their more famous colleagues:

> *Allez où la patrie et l'humanité vous appellent. Soyez toujours prêts à servir l'une et l'autre, et, s'il le faut, sachez imiter ceux de vos généraux compagnons qui au même poste sont morts victimes de ce dévouement magnanime qui est le véritable acte de foi des hommes de notre état.*

One of the staff of this period was François Broussais, the bitter opponent of Laennec and also of the healing power of nature; he advocated the leech as a panacea for all ills, with a phenomenal effect upon the consumption, in the economic sense, of these creatures. By the middle of the nineteenth century the following were the outstanding figures at Val-de-Grâce: Jean-Antoine Villemin, who first demonstrated that tuberculosis could be transferred by inoculation, and who made other significant, and perhaps under-estimated, studies of the ætiology and histopathology of this disease; the surgeon Charles Sédillot, who coined the word "microbe"; and a little later again C. L. A. Laveran, the first to identify the parasite of malaria in the blood: Edmund Delorme, pioneer thoracic surgeon, who successfully performed decortication of the lung in 1893; the bacteriologists Hyacinthe Vincent (of Vincent's angina) and Charles Dopter, noted for his work on dysentery.

The museum of Val-de-Grâce is situated in some of the oldest parts of the Gothic monastery, notably in the original kitchen, the refectory, the exercise gallery above the cloisters overlooking the gardens, and the cloisters themselves. The archives section, dating from 1871, includes many notable letters, autographs and manuscripts, a section of which is

displayed. A section best described as an anatomico-pathological one is of almost as much historical as practical interest. A host of specimens, including *moulages* and models (in both of which all sections of the museum are particularly strong), missiles, pathological specimens and photographs, relate chiefly to the 1914-1918 war, but some exhibits date back to 1806 and to the Crimean War. Others refer to some of the experimental and research projects undertaken in the hospital over the years.

The collections dealing with the first World War in the sections devoted to the history of military surgery and hygiene are extremely thorough and comprehensive. Among the methods of protection studied are gas masks, "tin hats" and camouflage, their evolutionary stages being represented by examples from several countries. Beautifully made large-scale models, complete in every detail, illustrate hospitals at various points on the line of evacuation in different theatres of war and in different periods. Other models illustrate methods of carrying and transporting casualties, a notable example being a large model of Larrey's first horse-drawn ambulance. Medical and surgical treatment is reviewed, as well as aspects of sanitation and preventive medicine, particularly in relation to work done by the staff of Val-de-Grâce. Subjects dealt with range from types of fracture apparatus to blood transfusion and penicillin.

The section primarily devoted to history dates from 1893, and is especially remarkable for its fine collection of paintings. Rooms in the historical section are named after famous army doctors, some of whom we have mentioned. Portraits, busts, personal relics and reminders of the work of these men form the chief exhibits, but somewhere everything is represented. Nothing seems to have been forgotten, from the history of the uniform to the problems of pharmaceutical supply; several displays are devoted to the history of the hospital buildings themselves from their earliest monastic days. Perhaps, by way of example, attention may be drawn to the relics of the great Baron Larrey. These include the sword presented to him by Napoleon, his uniform, a death mask, and finally, most remarkable of all in a remarkable museum, his heart in a small engraved wooden casket.

From Larrey's heart it is a pleasant walk to one of the most breath-taking and unexpectedly beautiful sights of Paris, the tomb of Pasteur in the Pasteur Institute. Outside the Institute, close by the grave of Émile Roux and strangely unimpressive at close quarters, is the famous statue of Jupille struggling with the rabid dog. But Pasteur's tiny vaulted chapel, with its brilliantly coloured mosaic walls, its murals depicting his greatest triumphs interwoven with a grape-vine motif, is deeply moving, much more so than the curiously pagan and deliberate splendour of Napoleon's vast monument a mile or so away. Pasteur's statue, indeed, appears to study the Hôtel des Invalides without emotion from its admirable vantage point in the Place de Breteuil. Thus are the contrasting lives of two great men remembered, each perhaps appropriately.

Perhaps in Paris more than in London, medico-historical interest is to be found in the most unexpected places. Possibly it is not surprising to find, in the Rue Soufflot, between the Luxembourg and the Pantheon, a pharmacy whose window display and interior are exactly those of a past century, or to see shops containing a variety of exquisite natural history preparations, or of anatomical models of fascinating complexity and ingenuity. It is, however, curious to see an Egyptian mummy for sale at a pavement stall. The stall was one of hundreds taking part in a junk fair held annually in the Boulevard Richard Lenoir. There, in an atmosphere resembling that of an eastern bazaar, almost anything may be bought. There were bronze mortars of the sixteenth and seventeenth centuries; one was inscribed with the maker's name and the date A.D. 638; numerous excellent "fakes" were recognizable chiefly by their comparative lightness. Prices were moderate compared with those asked for the equally numerous examples in antique shops. On the other hand, functionally useless nineteenth century syringes and surgical instruments were an exorbitant price, apparently having acquired the mysterious value accorded to junk at a junk fair. Other items for sale ranged from faience pharmacy jars to fossils. Some of the bookstalls by the Seine sell medallions and plaques, many of which have medical significance. Among the cheapest possible souvenirs of Paris, medallions I acquired included ones honouring Larrey, Pasteur and Ramon Y. Cajal. Another depicts Jacques Necker, whose wife (aided by their daughter, Mademoiselle de Staël, the authoress) was chiefly responsible for the foundation of the Necker group of hospitals. These included the hospital in which Laennec's work was done. Today, its entrance carries a marble plaque showing a relief of Laennec with a brief appreciation of his work.

Some of the hospitals most famous in Parisian medical history no longer exist, while others, such as the Hôtel-Dieu, have been entirely rebuilt. The Hôpital St. Antoine, visited for its research in radiology on pulmonary disease, is another example, but parts of the old buildings have been deliberately preserved. The Salpêtrière, dominated by the octagonal dome of its unusual chapel, is entered through an archway guarded by a statue of Philippe Pinel, the first physician to adopt both a humane and a scientific approach to the problems of insanity. Beyond the arch are streets leading to various blocks of this enormous hospital; it is perhaps half a mile to the room where *moulages* and pathological specimens prepared by Charcot are hidden—hidden, rather than displayed, for they have not received the same care as has been given to his library. A life-size model of a young and emaciated woman with several grossly disorganized joints presumably illustrates the arthropathy which bears his name. The library is in an old and charming pannelled room upstairs, where it is easy to imagine oneself back in an age of unequalled excitement in medical discovery, an era which saw the development of the germ theory, rapid advances in surgery, physiology and biochemistry, and steady progress in the classification, description and diagnosis of disease. Here, in the books collected by one distinguished neurologist, all the activity in these and allied fields is reflected. In addition to the books in French there are many works in English and German—another sign of those days—and an impressive array of contemporary journals. In the section devoted to the history of medicine, which was extensively studied on the Continent in Charcot's lifetime, there are only two English books, an indication of the late start made in this subject by British workers. One of these is Bucknill's "Medical Knowledge of Shakespeare", and the other a collection of unimportant biographical essays. Charcot's consulting room is also preserved at the hospital.

Not far from the Salpêtrière is the Jardin des Plantes, one of Europe's earliest "physic gardens", originally established in 1626 during the reign of Louis XII; associated with its formation were Louis's physician, La Brosse, and Cardinal Richelieu. An interesting link between it and the Chelsea Physic Garden is the giant cedar of Lebanon, brought from England in 1734 by Bernard de Jussieu. The seeds were given him by Peter Collinson, noted on the commemorative plaque as *"médecin anglais"*; but he was a business man better known as a botanist. Collinson, a Quaker, was mentor and friend to Dr. Lettsom. His garden is now part of the grounds of Mill Hill School, near Barnet. De Jussieu is reputed to have brought back a cedar from Syria carefully planted in his hat, sharing with it his daily allowance of half a pint of water.

Many relics, works of art, pieces of period furniture and documents from the old hospitals of Paris are preserved at the Musée de l'assistance publique. This government department has dealt with matters of health and community welfare for over a century, and its example in establishing this remarkable museum might perhaps be followed elsewhere. On the Quai de la Tournelle, the museum occupies the Hôtel de Miramion, built early in the seventeenth century. The building is substantially unchanged, having suffered minor damage in the war of 1871, but none in the last two wars. For most of the last century the present museum rooms served as a central pharmaceutical store.

About 300 paintings, engravings and water-colours depict scenes of medical interest or importance, views of hospitals and prominent medical personnel. Busts include those of Broca and Velpeau, as well as those of Hippocrates, Galen and Diocorides. There is an excellent collection of over 100 medallions and plaques, mostly recalling prominent medical men; the only Englishman noted as represented was Edward Jenner. The exhibits of medical paraphernalia of historical interest are not perhaps as extensive and varied as might be expected, but the selection has been well made. The earliest bronze mortar is dated 1637 and it is over 15 inches in diameter. Pewter bleeding bowls range from the sixteenth to eighteenth centuries. A series of syringes includes a delightful pewter enema syringe of the type which could be easily self-operated—the patient sat on the nozzle facing the plunger in its barrel. The enema became almost part of the daily toilet in Paris, and some very much more elaborate and elegant models are described by Brockbank. The pewter bedpans, hot-water bottles, feeding cups and *pots de chambre* demonstrate how little the design of these important hospital and domestic utensils has altered in the last two hundred years or so. The only surgical instruments displayed are a series of urological instruments reputed to

have belonged to Dupuytren. The evolution of the modern feeding bottle is well illustrated by a series of exhibits, the earliest of which are the Roman era.

The *Salle des internes* at the Hôpital de la charité has been reconstructed in the museum. The walls of this extraordinary room are decorated by a number of murals, serious and comic. These are by notable painters, including Gustave Doré, who first gained recognition for his illustration of the works of Rabelais. One mural depicts a well-known charlatan being driven from the Temple of Science by Velpeau, another an anatomical demonstration by Professor Bouillard, and a third, Asclepius, to whom many benefactors of suffering humanity are paying homage, mostly gentlemen waving outsize models of their inventions, such as the amputation saw, the enema syringe, the urethral dilator and the trephine. About 40 portraits are incorporated in the elaborate design which covers the ceiling as well as the walls; Piorry, Broca and Charcot are among the subjects. In oils on wooden panels are a series of caricatures of contemporary internes and physicians of the Charité, including one Massary, *"long comme un jour sans pain"*.

There are some relics of the work of St. Vincent de Paul. One reminder of the plight of abandoned infants is a reconstruction of a "tower" designed for their disposal and reception into a charitable institution. The baby was placed on a platform through an opening on to the street. The platform would then be rotated and the baby taken out within the house. The device ensured anonymity, and is said to have reduced the number of infanticides, but its great disadvantage was that the child could never be reclaimed.

The feature of the Musée de l'assistance publique is a collection of almost a thousand faience pharmacy jars, mostly made in Paris, Rouen or Delft. The catalogue describes several basic patterns of these jars: oblong receptacles with spout and straight handles, used only by apothecaries; pitchers for oils, which were also used by grocers; bottles for distilled liquids; spouted pots for electuaries and balsams; smaller jars for pills and essences; the special tall theriac jar. In addition to theriac, the universal treatment attributed to the Roman court physician Andromachus, these jars were used for the universal antidote mithridatum, devised by King Mithridates of Pontus, and for alkermes, an aphrodisiac liquor deriving its name from its cochineal (kermes) colouring. Probably the most characteristic shape of pharmacy jar is that of the albarelli, cylindrical jars with concave sides forming a "waist", a shape reflecting that of the bamboo stem containers used many years previously in eastern countries for both drugs and spices. The art of glazing or enamelling earthenware was known in western Asia by the twelfth century, in Spain by the thirteenth, and in Italy by the fourteenth. The art of majolica or faience spread from Italy to the rest of Europe, and in succeeding centuries its development owed much to the needs and to the artistic sense of the apothecaries who used its products. All the beautiful jars in the present collection came from Paris hospitals, where they had been in regular use; today they serve as a reminder of the craftmanship and elegance of another age.

Near the site of the Bastille is a mansion, just over 400 years old, in which many of Mademoiselle de Sévigné's letters were written. It is now the Musée Carnavalet, which is primarily devoted to the history of Paris, and has a particularly detailed and intriguing section relating to the Revolution. Passing over the medical significance of working models of the guillotine (and, for that matter, of the monstrous blade which, with relics of Marie Antoinette, is on view at the Conciergerie), we may note the mortar and pestle (1672) inscribed with the name of the king's apothecary, Claude Regnault, and *jetons* (metal tokens) relating to societies of apothecaries, grocer-apothecaries and barber-surgeons (seventeenth and eighteenth centuries) and to the school of surgery. There are other exhibits of some medical interest, but these are of minor significance in a museum which is notable for its extraordinary number of personal items of historic value.

The Musée du Conservatoire des arts et métiers is mainly devoted to the history of pure and applied science. It was established in 1798 in an abbey abolished at the time of the Revolution. Unfortunately the industrial hygiene section, its closest approach to medicine, was closed for reconstruction, a fact which gives opportunity to refer again to the modern and attractive display methods of most Paris museums. The superb collection of clocks, for example, is displayed for the most part with each clock in an individual illuminated case, effectively placed. The care and thought given to arrangement are also shown in the way in which historic exhibits are integrated with items of less intrinsic importance to illustrate the evolution of knowledge in each branch of science. This is no collection of aged objects, but a deliberate study of the gradual acquisition of scientific data and of the steady development of new techniques. The survey is aptly illustrated by a surprising amount of original apparatus used by famous investigators. Its medical interest depends largely on one's interests in the basic sciences and in their application to techniques of medical importance; for present purposes it must suffice to mention that apparatus used by the Abbé Nollet, Lavoisier, Colomb, Daguerre, Niepce, Ampère, Foucault and Pascal is among the exhibits.

Perhaps the visitor from London is most impressed by the streets of Paris, by their breadth and by their faculty of seeming to go somewhere intentionally. A similar impression may well be gained of Paris museums.

Acknowledgements.

I am indebted to Dr. André Finot, curator of the Musée d'Histoire de la Médecine, and to Colonel J. Hassenforder, curator of the Musé due Val-de-Grâce, for their kindness in showing me their respective museums.

BRYAN GANDEVIA, London.

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Medical Societies.

THE MEDICAL SCIENCES CLUB OF SOUTH AUSTRALIA.

A MEETING of the Medical Sciences Club of South Australia was held in the Anatomy Department, University of Adelaide, on August 3, 1956.

The Experimental Method in Psychology.

S. H. LOVIBOND discussed the experimental method in psychology. He said that the essence of the experimental method was control and manipulation of the conditions under which observations were made. That implied preparation for accurate observation and the possibility of repetition of the observations. The usual sort of psychological experiment could be symbolized by S-O-R, which meant that the experimenter subjected the organism (O) to a certain stimulus situation (S) and noted the response (R). The stimulus might vary from a simple stimulus such as a pure tone to a complex social situation. R variables included conscious experience, patterns of movement, verbalizations and concomitants of autonomic nervous system activity. O variables included transient states (rested, fatigued, drugged *et cetera*), type (age, sex, phylogenetic position), practice (skilled or unskilled), operative interference, personality differences (attitudes, values, ideologies *et cetera*). (An important class of psychological experiments was concerned with the manipulation of O variables rather than S variables.)

Special problems in psychological experimentation were: (*a*) Experimental treatments were almost always irreversible (the organism was permanently changed); hence it was rather seldom that the subject could be used as his own control. (*b*) The process of measurement often changed the O (for example, use of attitude scale). (*c*) The attitude of the S towards the experiment and his knowledge of the procedures were important variables calling for control.

Referring to the relation of experimental to other methods in psychology, Mr. Lovibond said that the experimental was the most powerful method available when conditions for its valid application were met. Those included the possibility of bringing all the important determinants of the behaviour under control (both S and O variables). That condition was most readily met in the case of behaviour

which was relatively independent of previous experience (for example, certain basic processes of perception). The difficulty increased during movement towards complex social behaviour. Under those circumstances the psychologist had to use methods which were less rigorous, but which were more adapted to the nature of the material (for example, interview, case history, personal documents, field observation). The use of those alternative methods did not in the least imply that the investigation would necessarily thereby become less scientific.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

THE DUTIES OF AN ASSISTANT SURGEON: GOVERNOR MACQUARIE TO EARL BATHURST.[1]

[From "Historical Records of Australia".]

28 April, 1814.

MR. ASSISTANT SURGEON LUTTRELL, who has been until lately stationed at Parramatta, having made a demand on Government for pecuniary Remuneration for Medical Attendance on the Military Detachment stationed here I beg to inform your Lordship that I have resisted the Demand on the Ground that he was amply paid as an Assistant Surgeon on this Establishment without any further Remuneration whatever. I am sorry to add in regard to Mr. Luttrell that so far from performing extra duty he has been very culpably negligent of that which he ought to perform and in Consequence of this Neglect I have been under the Necessity of removing him from Parramatta to Sydney in order to his being more immediately under the Eye and Control of the Principal Surgeon. Mr. Luttrell having procured a certificate of his having attended on the Military at Parramatta from Lieut Colonel O'Connell Commanding the 73rd Regt I understand that he means to make an official Application to His Royal Highness the Commander-in-Chief for that Remuneration for his Attendance on the Detachment which I have considered it my duty to withhold from him as altogether unreasonable. I deem it my Duty thus to apprize Your Lordship of Mr. Luttrells intended Application to His Royal Highness in order that Your Lordship may take such steps as may appear advisable for preventing the Compliance of His Royal Highness with a Claim which appears to me highly unwarrantable and unjust. If it should be admitted it will of Course form a fair Precedent for similar ones being made by the other Assistant Surgeons at the several subordinate Settlements where Military Parties are Stationed.

Correspondence.

INTERNATIONAL TRENDS IN MEDICINE.

SIR: Recently I read with great interest the leading article entitled "International Trends in Medicine" in your issue of May 19 last. For the sake of historical accuracy in what you describe as an epoch-making event—that is, the meeting in London in August, 1946, which was the precursor of the World Medical Association—may I correct some errors of fact?

The meeting was convened by the British Medical Association and not by *Association professionelle internationale des médecins* (A.P.I.M.). The British Medical Association was represented by two delegates, and not by observers. These were the late Dr. Alfred Cox, beloved and revered former secretary of the British Medical Association, and myself.

The following further information may be of interest. The meeting was held in the Council Chamber of British Medical Association House under the chairmanship of Sir Hugh Lett, at that time President of the British Medical Association. The organizing secretary of the meeting was Dr. E. E. Claxton, then, as now, an assistant secretary of the British Medical Association. I had the honour to be elected a member of the small organizing committee which was then set up to draft a constitution for what was to become the World Medical Association, and I was elected a member of the first Council when the World Medical Association was inaugurated in Paris in 1947.

The purpose of this letter is to make it clear that the British Medical Association took the initiative in the formation of this important organization and has always played a great part in it.

Yours, etc.,

J. A. PRIDHAM.

"Hillfield",
Broadway,
Weymouth,
England.
August 20, 1956.

THE TREATMENT OF ULCERATIVE COLITIS.

SIR: With reference to the correspondence on the ætiological basis of ulcerative colitis, I owe an explanation to Dr. J. W. Graham and others interested in the correspondence about my delay in replying to his letter of June 2. In that letter he expressed his scepticism about my views that there was a neurosis basis for ulcerative colitis and a large number of other diseases of doubtful ætiology. He asked if I would relate how I arrived at this conclusion.

In reply, I have written an account of the salient features, clinical and otherwise, that have formed my views on the subject. As the period covered was twelve years or more, and as the subject matter was of considerable complexity, the letter was lengthy, approximately 3500 words. For various reasons you cannot print such a long letter. I must confine my reply to 750 words. This I am unable to do without losing the lucidity of the context.

To solve the dilemma I have forwarded my reply separately to Dr. Graham, and I will forward a copy on request to any interested member.

Yours, etc.,

BRIAN HAYNES.

185 Macquarie Street,
Sydney,
August 29, 1956.

A NEW REFLEX.

SIR: We have noted a new reflex in two patients here. Notes on these two cases are as follows.

A., aged forty-six years, suffers from confusional insanity with alcoholism. He is a chronic alcoholic who was admitted to Lachlan Park Hospital recently. He had been treated in a general hospital in December, 1955, for irritation in his legs, difficulty in walking, and numbness in the hands—apparently indicative of some degenerative change in the spinal cord and peripheral nerves. He had lost weight. Originally he weighed over 14 stone; he now weighs 10 stone 12 pounds. He was in satisfactory health. Physically normal, neuropsychologically he showed evidence of changes. He was over-affable and euphoric. He said that he had needles in his arms (a sensory hallucination resulting from the neuritic changes) and he wanted the needles taken out. After admission he was restless, boisterous, euphoric and confused. He struck one of the male nurses. He improved rapidly following treatment with vitamin *B* complex, extra nutrition and "Pacatal" tablets (25 milligrammes) one three times a day. His knee jerks, at first absent, were able to be elicited a week after admission. His plantar reflexes were not elicited. He showed the immediate spread of reflex phenomenon markedly when his knee jerks were tested; an immediate extension of movement occurred in both upper limbs, and slightly in the head and trunk. The new phenomenon was repeatedly elicited.

The knee jerk, it would appear, is part only of a more marked response, which response, however, is rarely noted.

The second patient, B., was also recently admitted. He also suffered from an alcoholic psychosis. He was twenty-seven years old. He was a chronic alcoholic. His mental state had showed evidence of disturbance. He had had

[1] From the original in the Mitchell Library, Sydney.

hallucinations of hearing. He said that his mother and also his father were up a tree. He was restless, euphoric and apprehensive. He also had had hallucinations of sight. After admission he was still hallucinatory. He was seeing police cars outside, and he imagined that the police were arresting people. He complained of irritation of the skin, the apparent result of peripheral neuritis. Physically in fair health, he showed some tremor of his limbs. His plantar reflexes were normal. His knee jerks were rather exaggerated; when testing this reflex, it was noted repeatedly that the knee jerk phenomenon was accompanied immediately by a spread of a reflex movement to the upper limbs. A reflex flexion movement of the head also occurred.

It is not known if this special extension reflex is to be found only in alcoholics.

Yours, etc.,

N. R. PATERSON, M.B. (Sydney),
S. G. CANTOR, M.B., D.P.M.

Lachlan Park Mental Hospital,
New Norfolk,
Tasmania.
August 29, 1956.

THE MEDICAL BENEFITS FUND OF AUSTRALIA AND SERVICES RENDERED IN PUBLIC WARDS OF HOSPITALS.

SIR: Dr. Grieve in his letter of August 8 (issue of THE MEDICAL JOURNAL OF AUSTRALIA of August 18, 1956), in reply to Dr. G. A. Scarlett, states that "the Medical Benefits Fund pays its own benefit for an ophthalmological service, not *ex gratia*, but as a matter of moral and legal obligation to the contributor, because in this case the contributor pays a fee".

In no pamphlet issued by the Medical Benefits Fund is there any statement that a benefit is payable in respect of a refraction, and on inquiry at the office of the Fund one is informed that a payment is made *ex gratia*.

Dr. Grieve blames the claims officers for sending to contributor patients the stereotyped letter which, as Dr. Scarlett states, "infers in no uncertain manner that the doctor who sends an account to a public ward patient is guilty of a heinous criminal offence". Surely the executive of the Fund must accept responsibility for sending a letter which has given rise to some strong criticism of the Fund, and not throw the onus on to members of the staff.

Dr. E. F. Thomson, in his letter of August 8 (issue of THE MEDICAL JOURNAL OF AUSTRALIA of August 18, 1956), made it clear that the Council of the New South Wales Branch of the British Medical Association "is firmly of the opinion that payment of benefits should be made in all cases of insured persons in public hospitals irrespective of their classification".

I would like to ask Dr. Grieve whether it is not a fact that the Medical Benefits Funds have opposed the payment of benefits to patients in public wards on the ground that it would affect the financial stability of the Funds?

Yours, etc.,

C. E. WINSTON.

201 Macquarie Street,
Sydney,
August 27, 1956.

SIR: I will reply for simplicity to my friend Dr. Winston's letter by paragraphs.

Paragraph 1: The statement in my letter of August 18, 1956, was strictly correct. The use of the term *ex gratia* in this class of case is irrelevant. The Executive Committee's decisions and the reasons for them are the tests to be accepted.

Paragraph 2: There are many benefits paid by the Medical Benefits Fund which are not publicized in pamphlets. Pamphlets are used for advertising only, and there is no significance in the failure to mention any specific benefit.

Paragraph 3: I do not believe I blamed anyone. It was not my intention to blame anyone because there was no reason to blame. The claims officers who, incidentally, do not consider I was blaming them and who from time to time have expressed gratitude for their reception by the committee and myself, were merely carrying out a government instruction in composing the routine letter referred to; they were complying with a legal direction as they have in respect of many other circular instructions. Perusal of the text of circular N.M.13 in my letter (THE MEDICAL JOURNAL OF AUSTRALIA, September 1, 1956) will indeed support that they were in fact careful in their choice of words. It is a simple exaggeration to say the words of their stereotyped letter suggested a "heinous criminal offence" was being committed. This stereotyped letter was in use eighteen months before anyone drew attention to it, and then a sentence was taken out of it in accordance with the committee's previous decision on a similar matter because it was redundant and could cause misunderstanding.

Paragraph 4: Dr. Thomson's quoted statement could only have been complete if it had included the basic fact which I mentioned in my original letter to THE MEDICAL JOURNAL OF AUSTRALIA that the British Medical Association had approved the 90% rule. Indeed failure to mention this would give the average reader an incorrect impression, as it clearly did to Dr. Winston. The British Medical Association, that is, the Federal Council, in laying down policy has repeatedly agreed with the Minister of Health, as does every competent authority in Australia or the United States of America, that in order to avoid abuse and threats to the solvency of the insurance funds the patient must pay a fraction. This rule is vital to any medical benefits insurance scheme voluntary or compulsory.

Paragraph 5: The distinction I mentioned in my reply to Dr. Metcalfe is again apposite here. We are not concerned with patients in public wards, for they may be intermediate; we are concerned with patients classified public. I can only answer for the Medical Benefits Fund of Australia. Our Fund will pay benefits to classified intermediate or private patients, whatever ward they occupy, but the Fund does not pay benefit to those classified public because they pay no fees at all. To do so would, as I pointed out in reply to paragraph 4, ultimately involve the solvency of the Fund, strong as it is now. Weaker funds would, we believe, quickly become involved. Perhaps it would be well to remember at this point that if major medical benefit funds in Australia became unable to pay, the National Health Scheme would collapse. That would be a tragedy for the nation, the contributing public and the profession alike. The alternatives can be left to the imagination and to sorrow. Even our friends sometimes forget these things, but I do not include among the forgetful Dr. Winston, with whom I have discussed much of this reply.

Yours, etc.,

H. R. R. GRIEVE,
Chairman, Medical Benefits Fund of Australia.

113 Homer Street,
Underclifle,
New South Wales.
September 6, 1956.

THE ÆTIOLOGY OF SCHIZOPHRENIA.

SIR: Dr. Cade, in an article entitled "The Ætiology of Schizophrenia" (appearing on July 28), comes to a conclusion which does not seem to be warranted on the data and observations he supplies. His hypothesis may be true and worthy of inclusion in any list of ætiological factors. I cannot agree with his attempts to disprove other generally accepted ætiological factors.

In order to study possible ætiological factors, he visited a sample of country towns and "demonstrated very clearly" six points. His reason for the visit was " . . . the assumption that the differences noted in Table II represented real differences in frequency and not merely the chances of distribution . . .". Table II shows in fact that the correlation between population size and numbers of cases of schizophrenia is (Rho) +0·040—that is, virtually nil. (Table II as it stands is only a sample of the full data, but taken from the two extremes as described in the text.) From the data he supplies one can conclude that schizophrenia bears no relationship to population, no matter how dense or how dispersed, in the 19 country towns he cites in Table II. It is perhaps uncertain, then, what he could find in the visited country towns, as the initial assumption is incorrect.

It is in fact not surprising that Dr. Cade should find that there is no relationship to the frequency of schizophrenia, because one variable, to which he attempts to state a relationship, appears to be distributed by chance. In this way he excludes family stability, culture, economic and

social status from having any ætiological basis, and from this negative proposition derived from observation with a chance distribution, "inevitably one turns towards possible physical differences".

The given reason for this search for possible physical differences is to answer the question: "Why should population density and economic status be determining factors under urban conditions of living and not in country areas?" With respect to Melbourne, Dr. Cade has given figures which yield a correlation coefficient (Rho) of +0·445. With respect to country towns he has shown there is no significant relationship to population size at all. This determining question in his argument has no support in the figures he supplies.

There is, in fact, considerable evidence in the literature to support the very factors that Dr. Cade disposes of. One such has appeared since Dr. Cade's paper was prepared. This is by Hare (1956) dealing with social conditions in Bristol, in which he finds there is a correlation coefficient of +0·63 between schizophrenia and the proportion of single-person households (probability less than 0·001), and a figure of +0·37 for the relationship to population density (not statistically significant). The correlation coefficient for schizophrenia and mean rateable value was +0·27 (not significant).

There is one curious observation that Dr. Cade makes but does not comment on. Many observers have commented on the differential between rural and urban figures, and ratios as high as 2·1 to 1 (urban to rural), and down to 1·3 to 1 are quoted (Bellak, 1948). Dr. Cade's ratio is in the reverse direction, with rural exceeding urban by 1 to 1·05. The probable discrepancy may arise from the fact that Dr. Cade has only included towns of over 1000, and there remains the residue of smaller towns and sparsely settled areas. This is a problem that could readily be settled, and might be of interest in view of the highly urbanized nature of the Australian population.

Finally, I would like to mention what I feel is a more practical approach to the question of the ætiology of schizophrenia. Any such approach must make some provision for multiple ætiology in some way as, for example, the following: (i) somatic predisposition; (ii) socio-psychological predisposition; (iii) psychological precipitating causes; (iv) somatic precipitating causes.

It is then customary to view (i) and (ii) as a continuum between a hypothetical completely somatic predisposition and a completely socio-psychological disposition. As little can be done for genetic and body-build factors, more immediate gain for the patient will accrue from a consideration of the second heading. Likewise (iii) and (iv) are viewed as a similar continuum. Any bias towards either the somatic or psychological extremes on the part of the psychiatrist may lead to neglecting important somatic or psychological aspects, to the detriment of the patient.

The detriment that may follow biased diagnosis is implied by Whitehorn and Betz at the Johns Hopkins Hospital. "The comparisons and contrasts . . . indicate that improvement is most likely to occur: (1) When the physician indicates in his personal diagnostic formulation some grasp of the personal meaning and motivation of the patient's behaviour, going beyond mere clinical description and narrative biography."

Several other correspondents in your columns recently have referred to the necessity of correct diagnosis. With respect to the use of the term schizophrenia as a correct diagnosis, I would like to quote the remarks of T. P. Rees, currently president of the Royal Medico-Psychological Association. He stated (1951): "As for schizophrenia, I think that the term has little meaning; it often signifies no more than that the patient is mad; it carries no clinical picture, no prognosis, and no clear indication for treatment." As prognosis and treatment follow diagnosis, such a vague diagnostic term may be of little value, no matter how correct it is.

Yours, etc.,

J. S. B. LINDSAY,
Psychiatrist.
Ballarat Mental Hospital,
Ballarat,
Victoria.

August 17, 1956.

References.

BELLAK, L. (1948), "Dementia Præcox", Grune and Stratton, New York.

HARE, E. H. (1956), "Mental Illness and Social Conditions in Bristol", *J. Ment. Sc.*, 102: 349.

REES, T. P. (1951), "A Note on the Indications for Shock Therapy", *J. Ment. Sc.*, 97: 144.

WHITEHORN, J. C., and BETZ, B. J. (1954), "A Study of Psychotherapeutic Relationships between Physicians and Schizophrenic Patients", *Am. J. Psychiat.*, 111: 321.

Obituary.

WILLIAM GILFILLAN.

DR. A. BRITTEN JONES has forwarded the following appreciation of the late Dr. William Gilfillan:

The late Dr. William Gilfillan was born at Jamestown, South Australia, on May 16, 1898. His sudden and untimely death came as a great shock to his many friends in all walks of life. His father, of Northern Irish stock, had established himself in the rich farming land of the Middle North of South Australia. Of a family of four children, William alone entered the professional world, but in doing so he always retained his interest in, and love of, the land.

William Gilfillan received his early education at Jamestown, and after matriculating at the high school he entered the medical school of the University of Adelaide, graduating in 1921. After twelve months as resident medical officer at the Royal Adelaide Hospital, he went to London for further post-graduate study; even at this early stage of his medical career he showed a keen interest in what was destined to be his final choice—dermatology.

On returning to Adelaide in 1926, he joined the partnership of the late Dr. J. M. Bonnin and the late Dr. C. F. Pitcher at Hindmarsh, where he was actively engaged in general practice until 1935, when he returned to London to specialize in dermatology. On returning home he took rooms on North Terrace, where his sound general background and specialized knowledge soon established a large consulting practice. He was appointed a clinical assistant to the dermatological section of the Royal Adelaide Hospital in 1936, and later

clinical assistant to the radium section. He was also honorary dermatologist to the Parkside Mental Hospital from 1939 to 1956. In 1945 he was appointed honorary dermatologist to the Adelaide Children's Hospital, where he attended until the time of his death. He was a foundation member of the Dermatological Association of Australia. Although not holding executive rank in the South Australian Branch of the British Medical Association, he acted as honorary secretary to the entertainment committee for the Australasian Medical Congress (Fifth Session) in Adelaide in 1937. From his earliest years he was a martyr to asthma, and his health precluded his enlistment in the armed forces. Such were his courage and his patience under his disability that few but his intimates realized its intensity.

"Gil", as he was affectionately known to his many friends, had a flair for ball games, especially golf, tennis and billiards. He played pennant golf and pennant tennis, and was one of the best amateur billiard players in the State. He was a member of the committee of the Royal Adelaide Golf Club, and one of his greatest sacrifices was in giving up this sport when his health demanded it; he then devoted his spare time and energy to his garden, with the same outstanding success.

I first met Gil during my students days; we qualified together, and a friendship developed which will always be one of my most treasured memories. His success in many spheres I attribute to his tenacity of purpose allied with a balanced judgement and sound common sense—qualities soon recognized by the younger generation, many of whom turned to him for advice and wise counsel, which was readily given. He had an uncanny gift of getting down to fundamentals, and this, allied with an exceptionally keen sense of humour, made him a brilliant *raconteur*. A charming side of his nature was his appreciation of a joke against himself.

The delightful atmosphere at the Gilfillans's home, and the sincere welcome always forthcoming, made informal visits a great pleasure to their many friends. William married Mavis, daughter of the late Mr. and Mrs. Horace Marsh, and is survived by his widow, three sons and a daughter, to whom the profession extends deepest sympathy.

EDWARD BONAVENTURE HEFFERNAN BROTCHIE.

We have received from Dr. A. C. Thomas the following tribute to the late Dr. Edward Brotchie.

All the Saint George district in Sydney was shocked when the news came over the air on the night of August 13 of the violent death of Dr. Edward Brotchie. He was known to so many throughout this area, having been Assistant Medical Superintendent at the Saint George Hospital for some years. If any man ever deserved such a death it certainly was not Dr. Brotchie. His whole life and interests were fully occupied in the service of others, not only his patients, who were very fond of him, but also the whole community in a spiritual manner. He was a most devout member of his church and was a most prominent layman in its councils, as well as a lay preacher. He suffered from a serious speech affliction, and he told me once that he took up lay preaching in order to try and overcome this defect. I am told that in the pulpit he was most fluent. He was particularly interested in the work for young people in his church and its missionary enterprises. He had made several visits to missions in foreign fields, and at the end of last year spent some weeks at a mission station in the heart of New Guinea assisting the missionary, not only medically but spiritually. The respect in which he was held by the members of his church was shown by the number of ministers who attended his funeral.

As mentioned above, he came to the Saint George district in 1941 as Assistant Medical Superintendent of the Saint George Hospital. A graduate of the University of Melbourne, he had previously practised in South Australia. He commenced practice at Kingsgrove in 1946, and very quickly gained a large clientele. His standard of work was of a high order and his patients' welfare his first consideration. During these years work brought us together a great deal, and I got to know him and his ideals very well, and the profession cannot afford to lose men like him without suffering therefrom.

As would be expected, he was a good family man, a most devoted husband and father, one of his greatest joys being to accompany them almost every year to the snowfields. The sympathy of his colleagues goes out to Mrs. Brotchie and her three daughters, the eldest of whom is a second year medical student at the University of Sydney.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 49, of August 30, 1956.

NAVAL FORCES OF THE COMMONWEALTH.

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Appointments. — Samuel Francis Hewitt Haughton (Surgeon Lieutenant-Commander (for Short Service)) is appointed Surgeon Lieutenant-Commander, with seniority in rank of 1st February, 1953, dated 20th June, 1956. William Russell Richards is appointed Surgeon Lieutenant (for Short Service) (on probation), dated 5th July, 1956.

AUSTRALIAN MILITARY FORCES.

Citizen Military Forces.

Northern Command.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of 1/46764 Captain A. J. Kerr is terminated, 10th May, 1956. To be Captain (provisionally), 11th May, 1956: 1/46764 Allan James Kerr.

Eastern Command.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of F2/2804 Captain J. Hughes is terminated, 17th May, 1956. 1/61846 Honorary Captain N. P. Cleeve is appointed from the Reserve of Officers, and to be Captain (provisionally), 14th May, 1956. To be Captains (provisionally): F2/2804 Joan Hughes, 18th May, 1956, and 2/79312 Peter Richard Degotardi, 2nd July, 1956.

Southern Command.

Royal Australian Army Medical Corps (Medical).—The provisional rank of 3/101026 Captain J. W. C. Riddell is confirmed.

Western Command.

Royal Australian Army Medical Corps (Medical).—To be Major, 20th July, 1956: 5/10586 Captain (Temporary Major) N. H. M. Colyer.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

Northern Command.—To be Honorary Captains: Kenneth Moo, 15th June, 1956, Arthur Vincent Kenneth Meehan, 13th July, 1956, and Miriam Stafford and Langton Patrick Kelly, 16th July, 1956.

Eastern Command.—To be Honorary Captain, 25th July, 1956: Thomas Kinman Fardon Taylor.

Southern Command.—To be Honorary Captain, 10th July, 1956: John Vanston Rymer.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force: Medical Branch.

The probationary appointment of the following Flight Lieutenants is confirmed: E. Solo (014782), S. A. Ward (033933), K. N. Maunder (0217162), I. MacLachlan (0310756).

Research.

NEW SOUTH WALES STATE CANCER COUNCIL.

THE New South Wales State Cancer Council invites applications for grants from a fund established for the support of fundamental and clinical research into cancer. Allotments will be made as follows: (a) research fellowships; (b) travelling fellowships; (c) grants in aid.

Research Fellowships.

Research fellowships are available to medical or science graduates, or to persons with equivalent scientific training. Fellows are expected to devote the whole of their time to their approved research project. Fellowships will be granted

for a term of one, two or three years, in the first instance. The work of a Fellow must be carried out in an approved institution or department, under the supervision of an approved worker. Before application for a fellowship is made, it will be necessary for candidates to have made satisfactory arrangements in that regard, and for the head of the institution or department to have agreed to sponsor the project. The salaries of Fellows will be based on the scale of salaries adopted by the National Health and Medical Research Council.

Travelling Fellowships.

Travelling fellowships may be granted for a period of two years abroad, followed by a third year in an approved institution in New South Wales. The remuneration ranges from £1500 to £2000 *per annum*, with approved travelling expenses.

Grants in Aid.

Grants in aid are available to institutions or departments with basic facilities and qualified personnel for cancer research, to support specific research schemes under the direction of particular workers. Grants will be made annually to cover all the financial requirements of approved research programmes, except the salary of the head of the sponsoring institution or department concerned and the use of facilities already available for the purposes. In the first instance, grants will be made for periods of one, two or three years. Applications for grants in aid should be prepared by the workers in charge of the projected programme, and submitted by the head of the institution or department. When an application involves the employment of staff, such application must pass through the appropriate official channel (for example, registrar, personnel or staff branches) for certification as to salary award rates before the application for a grant in aid is submitted to Council.

General Information.

Fellowships and grants in aid should be taken up within six months of notification of allotment. The closing date for applications, which should be forwarded to the Secretary, New South Wales State Cancer Council, Box 3944, G.P.O., Sydney, is October 22, 1956. Application forms may be obtained by writing to the above-mentioned address, or on personal application to Room 12, 6th Floor, 52 Bridge Street, Sydney, or to Inquiry Office, School of Public Health and Tropical Medicine, University of Sydney.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Week-End Course in Rheumatic Diseases.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a week-end course in rheumatic diseases will be conducted in Sydney on October 20 and 21, 1956. This course will be of interest to general practitioners. The fee for attendance will be £3 3s., and further particulars may be obtained on application to the Course Secretary, the Post-Graduate Committee in Medicine in the University of Sydney, 131 Macquarie Street, Sydney. Telephones: BU 4497-4498. Telegraphic address: "Postgrad Sydney."

Royal Australasian College of Surgeons.

NEW SOUTH WALES STATE MEETING.

A MEETING of the New South Wales Fellows of the Royal Australasian College of Surgeons will be held at the Royal Newcastle Hospital, Newcastle, on September 29 and 30, 1956. The programme is as follows:

Saturday, September 29, at 2 p.m.: "Osteomyelitis", Dr. G. Kerridge and Dr. J. Steigrad; "Biliary Surgery in Retrospect", Dr. J. Smythe; "Investigations on the Post-Cholecystectomy Syndrome", Dr. J. Fleming.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED SEPTEMBER 1, 1956.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	1(1)	4(2)	..	..	..	..	..	6
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	3	..	..	..	..	..	3
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	..	..	..	..	..
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	1(1)	16(13)	9(9)	..	..	..	..	..	26
Diphtheria	2(1)	1(1)	..	..	..	..	..	..	3
Dysentery (Bacillary)	..	..	..	..	1(1)	..	1	..	2
Encephalitis	1(1)	..	..	1(1)	..	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	58(18)	39(26)	..	7(6)	..	8	2	..	114
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	3(1)	..	..	..	..	..	3
Malaria	..	..	1(1)	..	..	..	..	..	1
Meningococcal Infection	5(1)	1(1)	3(1)	1	..	1	..	..	11
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	1	4(2)	..	9(2)	1	1	..	..	16
Puerperal Fever	2(2)	..	..	..	..	..	..	..	2
Rubella	..	63(14)	..	..	..	..	..	..	63
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	6(4)	11(7)	4(2)	4(4)	..	..	..	..	25
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	1(1)	..	..	..	1
Trachoma	..	..	..	..	2	..	..	..	2
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	29(18)	17(15)	6(3)	12(9)	15(11)	5(1)	..	2	86
Typhoid Fever	..	..	..	..	1(1)	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne)	..	..	2(1)	..	..	..	..	..	2
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Sunday, September 30, at 10.45 a.m.: "Carcinoma of the Pancreas", Dr. Grayton Brown; "The Natural History of Cancer", Professor E. S. J. King.

The following train services will operate: Saturday: leave Sydney 9.22 a.m. (Flyer); Sunday: leave Newcastle 3.32 p.m., 3.52 p.m., 4.50 p.m.

This meeting is open to all medical practitioners.

Notice.

NAPT COMMONWEALTH FELLOWSHIP, 1957.

A FELLOWSHIP of £350, to enable a medical graduate from the Commonwealth to spend three months in the United Kingdom in the post-graduate study of tuberculosis, is offered by the National Association for the Prevention of Tuberculosis.

The intention of the award is to provide training and experience for a doctor who will subsequently play his part in the control of tuberculosis in his own country, the period of study leave to be at least three months in the United Kingdom. It is hoped that the successful candidate will arrive in the United Kingdom by the end of March, 1957.

Full particulars may be obtained from the National Association for the Prevention of Tuberculosis, Tavistock House North, Tavistock Square, London, W.C.1. The closing date for receiving applications is November 30, 1956.

SPECIAL GROUP ON AVIATION MEDICINE (BRITISH MEDICAL ASSOCIATION).

THE Special Group on Aviation Medicine (British Medical Association) will hold a scientific meeting in the Auditorium, Medical School, Mater Misericordiæ Hospital, South Brisbane, on Thursday, October 11, 1956, at 8 p.m. Dr. E. H. Anderson, of Qantas Empire Airways, will speak on his recent experiences overseas in aviation medicine matters. This talk will be followed by the showing of short films of topical interest. All members of the British Medical Association who are interested in aviation medicine are invited to attend this meeting.

Nominations and Elections.

THE undermentioned have applied for election as members of the South Australian Branch of the British Medical Association:

Smith, Sinclair Joseph, M.B., B.S., 1954 (Univ. Adelaide), 34 Phillips Street, Somerton, South Australia.

Miller, John Keetley, M.B., B.S., 1954 (Univ. Adelaide), 208 Wattle Street, Malvern, South Australia.

Nield, Alexander Cowell, M.B., B.S., 1955 (Univ. Adelaide), 5 Avenel Gardens Road, Medindie, South Australia.

The undermentioned has been elected as a member of the South Australian Branch of the British Medical Association: Carter, Melville Lional, M.B., B.S., 1952 (Univ. Adelaide).

Medical Appointments.

Dr. A. J. Metcalf has been appointed a member of the Pharmacy Board of the Australian Capital Territory, pursuant to the provisions of the Pharmacy Ordinance, 1931-1937.

Dr. A. J. Metcalf has been appointed a member of the Dental Board of the Australian Capital Territory, pursuant to the provisions of the Dentists Registration Ordinance, 1931-1954.

Dr. L. F. Donnan has been appointed Psychiatrist Superintendent, Mental Hygiene Branch, Department of Health, Victoria, and also Superintendent of the Mental Hospital, Beechworth, Victoria.

Dr. W. E. L. Crowther has been appointed Medical Officer, Mental Hygiene Branch, Department of Health, Victoria.

Dr. A. J. Metcalf, Dr. H. E. Downes, Dr. G. M. Redshaw, Dr. J. A. James, Dr. J. A. Holt and Dr. A. S. Lane have been appointed members of the Medical Board of the Australian Capital Territory, pursuant to the provisions of the Medical Practitioners Registration Ordinance, 1931-1954.

Dr. H. C. Stone has been appointed Superintendent of the Mental Hospitals, Larundel and Janefield, and of the Repatriation Mental Hospital, Bundoora, Victoria.

Dr. L. L. Lovett has been appointed Deputy Superintendent of the Mental Hospital, Larundel, and of the Repatriation Mental Hospital, Bundoora, Victoria.

Dr. M. H. Troup has been appointed Deputy Superintendent of the Mental Hospital, Janefield, Victoria.

Deaths.

THE following deaths have been announced:

FRANCIS.—Shirley Elliston Francis, on September 2, 1956, at Malvern, Victoria.

SHIELDS.—Clive Shields, on September 4, 1956, at Melbourne.

DARLING.—Harry Cecil Rutherford Darling, on September 9, 1956, at Sydney.

Diary for the Month.

SEPT. 25.—New South Wales Branch, B.M.A.: Ethics Committee.
SEPT. 26.—Victorian Branch, B.M.A.: Branch Council.
SEPT. 27.—New South Wales Branch, B.M.A.: Branch Meeting.
SEPT. 28.—New South Wales Branch, B.M.A.: Annual Meeting of Delegates.
SEPT. 28.—Queensland Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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